A McGraw-Hill Publication
San Francisco, Calif.

September 1, 1925
25 Cents

Journal of Electricity

Devoted to the Economic Production and Commercial Application of Electricity
IN THE ELEVEN WESTERN STATES

Load Builders for Utilities

Careful surveys of consumers accounts for similar periods before and after the purchase of washing machines have demonstrated conclusively to scores of Public Utilities that the advent of a washer in a home means a material increase in the use of current. In some surveys this increase has amounted to over 50%.

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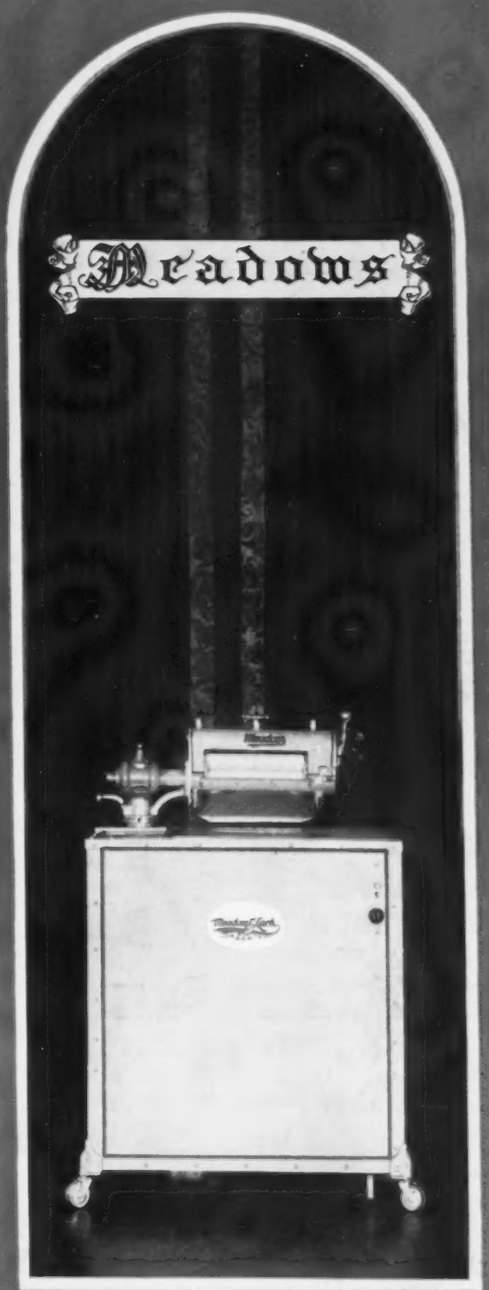

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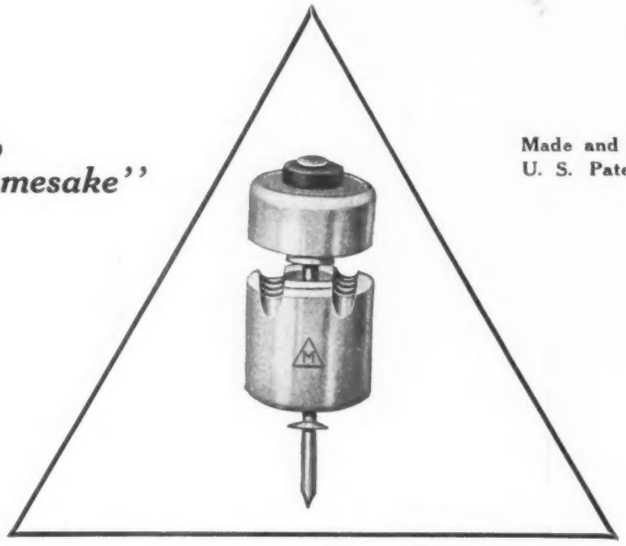
THE "BULL DOG"

ASSEMBLED SPLIT KNOB

"Has a Grip Like Its Namesake"



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The projection on the top piece, the recess in the bottom, the long cement coated nail, the top leather washer, the metal washer on the nail, are a few of the superior features of the Bull Dog Assembled Split Knob. Its the knob for the job.

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Devoted to the Economic Production and Commercial Application of Electricity

IN THE ELEVEN WESTERN STATES

A McGraw-Hill Publication

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ESTABLISHMENT of the Business Publishers International Corporation to meet more adequately the demand for specialized business publications in the fields of overseas trade and industry has been announced by the McGraw-Hill Company and the United Publishers Corporation. They jointly will control the new organization.

Three publications already in existence form the nucleus of the new company, which will maintain editorial and business representatives in the important commercial centers abroad. The papers are Ingenieria Internacional (International Engineering), a McGraw-Hill industrial and engineering monthly circulating in Spain and Latin America; El Automovil Americano and The American Automobile (Overseas Edition) in Australia, New Zealand, South Africa, India, Great Britain, Norway, Denmark, Holland, Belgium; in the Orient and other territories.

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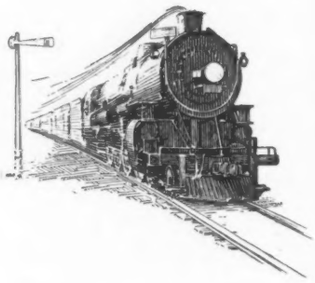
Stop



RAILROAD operation depends heavily on air brakes and block signals. These two essentials of safe operation for high speeds and heavy trains are provided by the Westinghouse Air Brake Co. and the Union Switch & Signal Company, both of which have made extensive use of Stone & Webster construction service for important additions to their plants.

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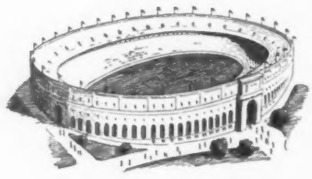

The seats are in two tiers fully enclosing the playing field and affording a capacity of 70,000. Mr. W. S. Hindman is Chief Engineer with Miss Marion K. Hindman assistant on architectural design.

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EDITORIAL

Conciliating the Ice Man

HOW'D you like to be the ice man?" "Well," you reply, "in the light of the possibilities of the domestic electric refrigerator, his prospects look not too good." No doubt he, himself, is viewing the situation somewhat with alarm, and yet we doubt if he need seriously concern himself. In the gradual transition from a universal use of the ice box to a like use of the electric refrigerator, he will find other uses for his ice service, or, failing this, he will pass quietly out of the refrigeration picture and into some other. You can't keep a good man down, and most ice men are good men.

If his days are numbered, at least they are numbered high. No sweeping change will be effected over night, and the ice man will have a long time in which to gage in which direction the wind of fortune is wafting him. Even after the most intensive application of brain and science to the production and distribution of automobiles for domestic and industrial use, we still find the horse has his place in the sun, while the electric and steam railroads already are beginning to recover from the first jolt administered by the jitney, the auto bus and the freight truck. Innumerable other examples could be cited from industrial history of the failure of a new device or process completely to supplant the old, or of instances where transition from old to new has been so slow as to be practically painless.

Nevertheless the ice man probably will have to be conciliated. In some instances he will be one of the largest power users of the utility company that is selling electric refrigerators to his ice customers. He will mention this to the general manager, and the sense of injury in his tone will be unmistakable. He will be told that a similar complaint came from the laundry man a few years ago when the utility company first initiated an intensive campaign on washing machines, and he will be shown that the laundries still are running. If ordinary arguments fail, the general manager can throw up his hands and say that he is powerless to stem an economic tide.

Industrial changes follow economic laws. If a thing is right it endures; if wrong, it soon reaches the limbo of forgotten things. Domestic refrigeration, it appears, is right and has come to stay, and the movement will grow in spite of the protests of the ice man, and whether or not the power company actually fosters the movement in its territory. Such influences may affect to some extent the speed with which the movement gains headway in some localities, and though they may to a degree retard it, they cannot stop it. So, be prepared to conciliate the ice man.

Dr. Harris J. Ryan's New High-Voltage Laboratory

IN the development of high-voltage transmission to 220,000 volts on the Pacific Coast, the laboratory of Dr. Harris J. Ryan at Stanford University has played an important part. Under his direction experiments were performed which resulted in the development of 220-kv. insulators. Five years were required for that work. In the meantime efforts of that eminent electrical scientist have been devoted to problems dealing with the study of corona and the measurement of energy at high voltages.

On another page of this issue Dr. Ryan discusses the new high-voltage laboratory which is being erected at Stanford and some of the problems which he expects to attack when it is completed. His advice to the industry is that the problems that must be met fifteen or twenty years hence should be attacked today. His impressions regarding the future of the power industry of the West are enlightening. The picture he paints of the future Pacific Coast transmission system is not an idle dream. Study of the economic development of this section of the country during the past decade indicates that his predictions must be realized if adequate electric service is to be supplied to the great metropolitan areas.

The industry will watch with keen interest the experiments which Dr. Ryan will conduct in his new laboratory, knowing that the future of high-voltage transmission will depend to a great measure upon the success of these studies.

Baker River Plant Is Monument to Engineers

BAKER River, the new 40,000-hp. hydroelectric plant of the Puget Sound Power & Light Company, will be completed early in October. To those unfamiliar with the details of construction of this station this announcement means little. As a matter of fact, the completion of the plant according to schedule is a high tribute to the engineers in charge of the development.

Late last summer labor trouble developed, resulting in a complete shutdown on the dam due to the activities of agitators. A few more days work at that time and sufficient concrete would have been

poured to insure the project against trouble from high water. When work was resumed, the period of high water had set in and many difficulties were encountered. Work in a narrow canyon with flood water at the maximum offered almost insurmountable obstacles. These obstacles were met and overcome and the balance of the work speeded up to the point where the plant could be completed as originally scheduled.

Labor troubles and the adverse forces of Nature are only a few of the difficulties which engineers charged with the construction of works of this character must overcome. If the public at large were to be informed of the romance of overcoming these obstacles it would have a higher regard and a greater respect for the men and companies which are furnishing it with electric service.

Hetch Hetchy Contract Saves Money for San Francisco

NOW that the Secretary of the Interior has declined to decide one way or the other as to the validity of the contract for the sale of Hetch Hetchy power, both parties to the controversy seem to be left high and dry as far as the legal status of the existing arrangement is concerned.

From a practical standpoint, however, the fact remains that a contract is in force between the City and County of San Francisco and the Pacific Gas and Electric Company by which the city is assured of an income of $2,000,000 per year from what otherwise would have been a non-productive asset for some time to come.

Why there should have been any division of opinion as to whether the interests of the taxpayers would best be conserved by obtaining an immediate income of $2,000,000 per year or nothing at all is beyond the ken of mortal man, especially in view of the fact that the contract was subject to cancellation by the city practically without notice at any time.

The Secretary of the Interior is quoted as having said, "I believe that the city should now be well satisfied that it has gone ahead with power delivery under the contract, and is reaping the profits from its great Hetch Hetchy venture." This utterance seems safe, sane, and the very essence of sound common sense, and, we venture to add, a matter of more than passing interest to the taxpayers of San Francisco, who may contemplate with undoubted satisfaction the possible reduction of the tax rate, a new idea in the annals of American municipalities.

Is the Power Company Interested in Radio Sales?

THOSE power company men whose duty it is to answer trouble calls on radio interference are perhaps of the opinion that the power company is interested in radio in the same sense that a summer boarder is interested in the mosquito crop. That the subject of radio from a central station standpoint has another aspect to it was forcibly brought home to the commercial manager of one western company recently who was checking up the results of a complete kitchen lighting campaign. He found one dissatisfied purchaser who admitted the worth of the illumination, but who complained of the size of the bill. The commercial manager did not believe the increased consumption of electricity was due to the kitchen light and made a few investigations for himself. He found that the customer had purchased a new radio set simultaneously with the revised lighting of his kitchen and was sitting up until two and three o'clock nightly to get the programs from favorite stations. He pointed out the effect of this practice upon bills—and the customer cheerfully paid the account. A little further investigation convinced the power company man that the purchase of a radio set was almost always coincident with a greater consumption of electricity for lighting purposes and he is now seriously considering radio as a side line to be handled by his company's retail department.

Another Check on the Results of the Home Lighting Campaign

DID the study of Home Lighting Primers in the homes of thousands of school children in all parts of the country have any appreciable effect upon the later lighting of their homes? It is possible to check up in a rough way upon the increase in number of outlets in new homes under construction, but this can be no accurate index of results. The effects would be shown rather in the number of lights replaced by those of a larger capacity and by the introduction of portable lamps at strategic points to remedy faults in fixture location which are not susceptible to ready change. Where the need for revision was more drastic and the means at hand to effect the reform, the contest may even have resulted in remodelled lighting in an old home. Very few of the families could have contemplated immediate building and probably the standards in this field were but little changed by the event. Here are three records from Utah which indicate something of what is going on in the average home, however, in those important household revisions which are so difficult to check because they do not show on the surface.

In the first place, Utah contractors report an unusual number of remodelling jobs for the present building season. Secondly, the records of one important electrical concern in that district show that sales of portable lamps have been two to one this year as compared with last. And thirdly a recent lamp shade class conducted by a Salt Lake department store called out a response from 435 women, or more than three times the usual number enrolling in such work. The driftwood on the surface indicates the direction of the current and these facts are significant in view of the glimpse they offer in evidence of the widespread interest in illumination which has recently developed in the home.

Skagit Problem May Be Solved

SEATTLE'S political puzzle, sometimes known as the Skagit power project, stands in a fair way of being solved. With the appointment of a committee of three independent engineers to make a study of

the situation and recommend the next step in its development the taxpayers of that city may hope for a solution of the problem that will result in the realization of a fair return on the millions invested. It is interesting to note that the engineers are all residents of the city; they are familiar with the enormous expenditures on the project and the political squabbles which have resulted. Had such a committee been empowered to make a study of the development before the initial bonds were voted and had they reported that approximately twelve millions would be needed to construct a plant which politicians promised the taxpayers for four millions, it is doubtful if the development would have been undertaken. Fortunately the appointment of this committee cannot be likened to calling in the doctor after the patient has died. In this case it is only the quack remedies that have failed.

DISCUSSION

Reader Warns Industry Against Dogma Preached by Gifford Pinchot

To the Editor:

Sir: Congratulations to you on your splendid editorial on Gifford Pinchot and his ideas of curbing the "electrical monopoly." You find he is rather careless as to his facts and conclusions.

I had an odd experience with Gifford Pinchot some years ago that threw a new light to me on his temperament and his actions. I was then a reporter on the New York Times. As everybody now knows, a famous quartette was once composed of Theodore Roosevelt, Gifford Pinchot, George W. Perkins and Amos Pinchot.

There came a time when the Pinchots hated Perkins and disliked to see him in the Roosevelt family. Yet Colonel Roosevelt stood by Perkins on many issues, and at last Amos Pinchot broke out in a public speech against the Bull Moose party and announced his intention to leave it and seek an alliance and amalgamation between the Single Taxers, the Socialists, the Labor party and one wing of the Bull Moosers—such as he could swing with him.

It happened to be my misfortune to report this speech, and, if I have eyes to see and ears to hear with, I know I did it correctly. But Gifford Pinchot, who was not present, rushed to the office of the New York Times and there gave his word of honor that it was all a lie—that the reporter had reported things his brother had not thought of or uttered. He declared Amos was still loyal to T.R. And Amos O.K.'d Gifford's version.

When I next reached the office of the Times after this visit by Gifford Pinchot I found myself fired off the bat and out of hand on Gifford Pinchot's say-so about what I had done.

I couldn't feel bad for myself as I left the Times office. I could only think, "Poor Gifford, poor Amos, they have got to live with themselves after making such a muss of their lives." I had been taught by David Starr Jordan at Stanford University that one had better so live that he can always remain good company to himself. And the ninth commandment rather loomed in my mind, "Thou shalt not bear false witness."

A beautiful thing happened right after that. I received a telephone call from Colonel Roosevelt's secretary, John McGrath. He said the Colonel wanted to see me, and we met at his office in connection with the Metropolitan Magazine. For two hours Colonel Roosevelt detailed to me his dealings with the Pinchots and then said, "I want to shake hands with you over my dead regard for Amos Pinchot, for he laid down on you as he laid down on me. And I can never work with him again, or with Gifford as I used to."

After that I noticed things—as to Gifford. I had been an ardent admirer of his. In the Masses magazine, professedly revolutionary, Amos Pinchot came out with an article labelling Theodore Roosevelt as "the great male beast of Oyster Bay" and practically duplicating my article about his public speech repudiating the Bull Moose party. I wondered then if Gifford would feel sorry. But he never relented nor made the amend I would have been glad to make had I wronged any human being on earth.

I noticed a little later that Gifford tried to launch himself for president on a boom as the man who settled the coal strike in Pennsylvania. Calvin Coolidge, incumbent of the presidency, had given Gifford the chance to settle this coal strike as the President's agent, yet he was using the flair of popularity the task brought him to run against President Coolidge for the nomination. It seemed typically unfaithful to me, from my viewpoint on him. Of course he got nowhere.

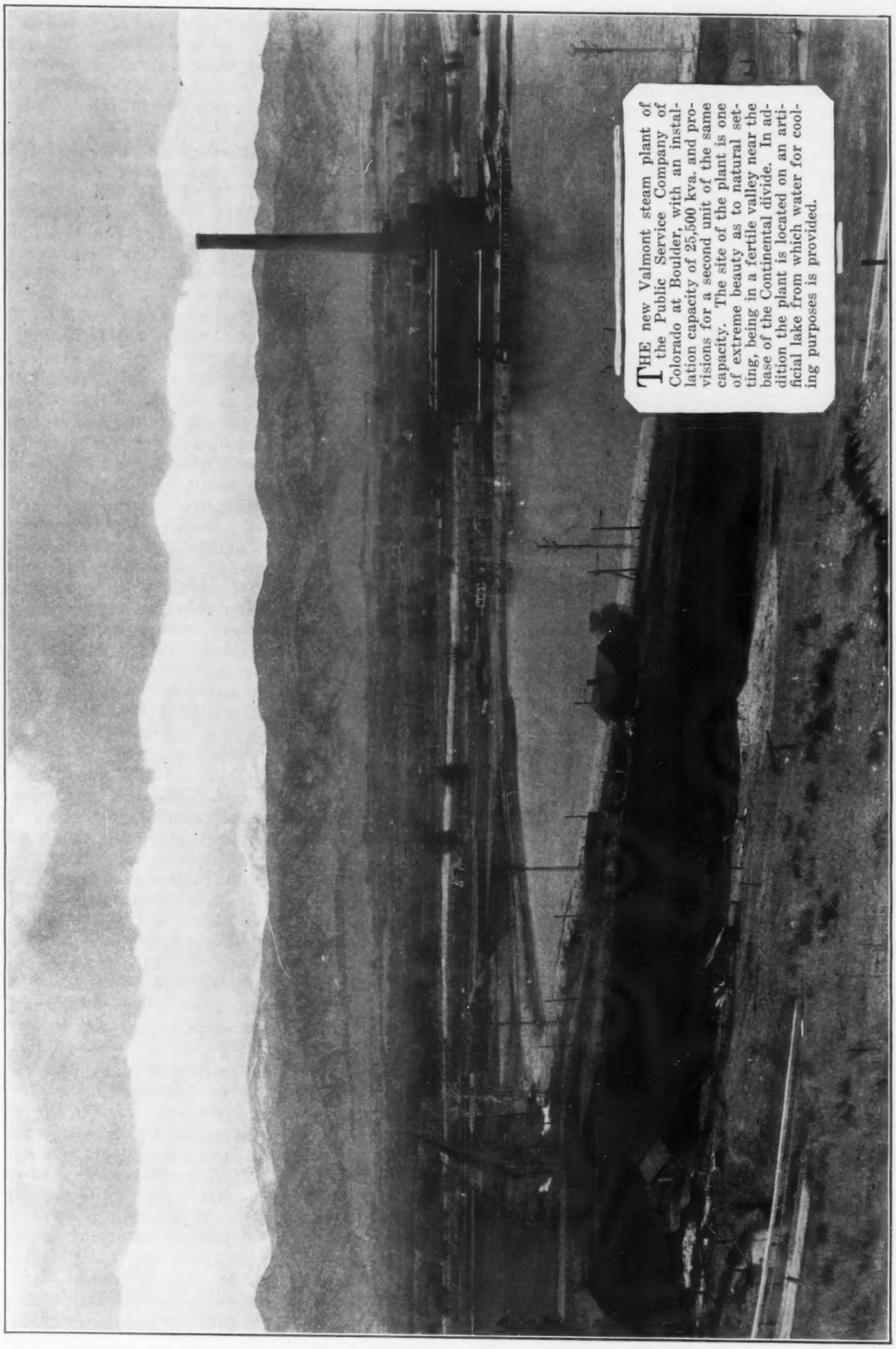
Next he ran for a presidential nomination on a prohibition issue combined with an assault on Secretary Mellon. He failed to make the Republican Convention as a delegate at large, however, and it was interesting to note that Secretary Mellon said of him, when he was shut out, that no one could tie to him very long or guess where he would be today by his utterances of yesterday.

You are up against a real political dogmatist in this giant-power and superpower issue. I am confident he will not see anything about giant-power that he does not wish to see or advocate anything but what he thinks will stir the populace.

I hope, under the circumstances, that the electrical interests develop every possible means of reaching the public and meeting Pinchot dogma with the facts of electrical development. A foe unhindered by facts or a respect for them can do damage only among the ignorant and uninformed. Public operation of railroads, telegraphs and shipping during the war wrote too sad a record of political pilfering to serve as a recommendation for a similar disposal of our electrical problems. I hope you keep your end of the story well to the fore.

I. K. RUSSELL.

Chicago, Ill., July 29, 1925.



THE new Valmont steam plant of the Public Service Company of Colorado at Boulder, with an installation capacity of 25,500 kva. and provisions for a second unit of the same capacity. The site of the plant is one of extreme beauty as to natural setting, being in a fertile valley near the base of the Continental divide. In addition the plant is located on an artificial lake from which water for cooling purposes is provided.

Valmont Steam Plant of the Public Service Company of Colorado

AMONG the interesting features of this new steam station is the fact that it burns pulverized coal for fuel, it is located upon an artificial body of water which it utilizes for condensate, and it has many unique features to preserve continuity of service. It has a capacity of 25,500 kva. and was constructed at a cost of $4,500,000. The editors are indebted to W. D. Hardaway and R. R. Throne of the Public Service Company of Colorado and to C. H. Vivian of Boulder for the material from which this article is prepared.

THREE points of general interest to power-plant engineers present themselves in the new Valmont steam plant of the Public Service Company of Colorado, a member of the H. L. Doherty group of utilities properties. 1—It is the largest plant of its kind west of Missouri Valley points utilizing pulverized coal as fuel. 2—It is the largest steam generating plant in the country situated upon an artificial body of water. 3—It utilizes a hydraulic structure near the source of the supply stream to equalize stream flow and to insure a sufficiency of water for condensation purposes.

Steam was decided upon as being the logical development after a survey of all of the possible water-power sites within 150 miles of Denver showed that there was none commercially feasible, at least at the present time. The city of Denver constitutes the greatest single load center on the company's system. However, the power demand on the remainder of the system throws the present load center of the entire system about 6 miles to the north of the city. Hence the location of the plant, about 25 miles due north of Denver, works out very well from several angles as will be seen from subsequent discussion.

There are no usable natural bodies of water in the vicinity. There are no streams of sufficient size to provide condenser cooling water for plants of more than 25,000 kw. without recirculation, and only one of even that size, the Platte River. To plan a plant to operate with a spray pond or a cooling tower also would involve the problem of supplying the necessary make-up water. Where water already is at a premium for domestic and irrigation purposes, it was considered to be poor practice to involve this heavy annual loss when other plans for power development not only would avoid most of this loss but provide additional usable storage. Consequently cooling water is provided from an artificial lake.

The plant location selected is near the confluence of the Middle Boulder and the South Boulder Creeks so that water for the lake is obtainable through a series of short canals. The present lake area of 120 acres later will be increased to an area of 540 acres and will have a capacity of 11,162 acre-ft. This will provide for an ultimate plant development of 200,000 kw. Both the Union Pacific and the Colorado & Southern Railroads touch the plant property which is 940 acres in extent, and thus provide excellent transportation facilities for fuel as both lines have broad contact with the northern Colorado coal fields.

Buildings

Facing south, the plant fronts on the artificial lake. The turbine room, heat-balance section and boiler room range in the order named from south to north. The circuit breaker bay adjoins the turbine room on the west while the coal preparation building is a separate unit located at the end of the boiler room with the stack between the two. An enclosed conveyor bridge over which the coal is transported from the pulverizers to the bunkers above the boilers is the only connection between the two buildings. A cross-section and plan of the power house is shown in Fig. 1.

The stack is 24 ft. in diameter at the bottom (inside), 16 ft. at the top and 375 ft. in height. This provides a draft of 331 ft. above the burners. To insure a working draft when the natural draft is insufficient an inner stack 5 ft. in diameter and 60 ft. high was installed. The top of this inner stack extends 12 ft. above the point at which the breeching enters, and a fan at the bottom will force air up through to create a draft to care for unusual conditions. Both stacks are of brick construction above a concrete foundation which is carried 12 ft. below grade to shale rock and extends 25 ft. above grade. The stack was erected by the Custodious Chimney Construction Company.

Cooling Water Development

One of the prime considerations affecting the selection of a site for the power house was that of adequate cooling water to provide for the present as well as for future development. This feature of the project will be watched with close interest by many power-plant engineers and executives. The degree of success attained and the obstacles which arise will determine in a large measure whether or not the future generating plants in the dry-climate areas of the West will follow this same general type. In an arid region such as Colorado where the mean annual rainfall is but 15 in. it is a genuine problem to secure an adequate water supply for a plant such as the one described in this article.

Direct use of stream flow is out of the question because of prior rights and because of the peak run-off characteristcs. This stream flow is due to the fact that the snows are comparatively light on the eastern slope of the Rocky Mountains, and consequently are all brought down in about two months. Such being the case, the plant site had to be one where the topography would permit the construction of an artificial lake of the size necessary and where there would be water available to fill this reservoir.

Underlying clay and hard shale at the point selected were almost ideal for the purpose. Further, the present 2,000 acre-ft. reservoir already was constructed and can be enlarged to the ultimate capacity by the erection of one large and several small dams. A hydroelectric plant belonging to the same company is located on Middle Boulder Creek and is provided with an 11,000-acre-ft. reservoir. Between the two a very efficient distribution and use of stored water will be possible that will result in benefit not only to the power company but also to the farmers who will benefit by the additional storage capacity at this point. Minimum stream flow can be maintained from the lower (steam plant) reservoir during the summer months when water is not needed for hydroelectric purposes, and this will permit the storage of water in the upper (hydro) reservoir until winter when it is needed for power purposes.

Drainage of the reservoir made possible the construction of all of the foundations and water-handling structures of the power plant on dry land. As this is quite an advantage over having to build these works under water conditions and as it would not be possible to drain the lake with the plant operating, intake structures for five units were completed along with the power house. At the present time the discharge water is allowed to flow back into the lake at the power house and near the intake. As the capacity of the plant grows it is planned to carry this discharge across a short space and dump it into the lake at a point where the return flow distance will be about three miles around a peniusula before it can again enter the intake.

The main dam will be 3,500 ft. long, 90 ft. high above the footings, 370 ft. wide at the base and 15 ft. wide at the crest. Preliminary investigations involved the drilling of 6,000 ft. of test holes and the making of 14,000 analyses. These were carried on with the idea of using the gravel-core type of construction which is extensively used in English engineering practice but which has not been used before in this country on a dam of this size.

Fuel

Lignite coal abounds in the districts adjacent to the plant and is mined in large quantities. This fuel is being used under the boilers with good results. In fact, the design of the fuel-handling and burning equipment is such that slack may be burned with no loss in efficiency. This fact, together with the fact that about half of the coal brought to the surface from the mines is otherwise unmarketable slack, assures the plant an ample and economical fuel supply, regardless of plant capacity. The average haul from mine to plant is about ten miles, and, as before mentioned, there are two railroads available for this service.

Due to the fact that this coal disintegrates so rapidly that it will support vegetation after three years exposure to the elements, no storage is provided at the plant at the present time. However, plans contemplate under-water storage facilities of moderate size to care for serious emergencies. At the present time coal is delivered to the plant at the rate of about ten cars daily for the one unit in operation. Bottom-dump cars are used normally, and the coal is dropped into a pit from which it is raised to a receiving hopper above the pulverizing equipment. The clam-shell hoist which serves this purpose also will serve to unload cars of other than the dump-bottom type. This hoist has a capacity of 150 tons per hour and provides weighing service while the coal is being hoisted.

From the hopper coal is fed by a short conveyor over a magnetic pulley to remove any tramp iron and on to the crushing machinery. Crushed to a one-inch size the coal is lowered to the raw coal bunkers. From this point the raw coal is fed through Woods driers, which utilize hot gases from the stack, and on to Raymond 6-ton pulverizing mills where it is ground to about the fineness of cement. The pulverized fuel then is carried to the top of the pulverizing building by means of air and dumped into 14-in. enclosed screw-conveyors which carry it to bins in the boiler room.

Storage of pulverized fuel to the extent of 40 tons is provided above each of the boilers. Four duplex feeders mounted on the bottom of each of the four bins deliver coal to the eight fantail burners where primary air at a pressure of from 16 to 20 in. is admitted. The rate of feed is controlled by variable-speed d.c. motors. Controls are so arranged that all feeds may be varied either in unison or individually. This feeder control is located on the boiler control panel together with instruments recording and indicating boiler performance.

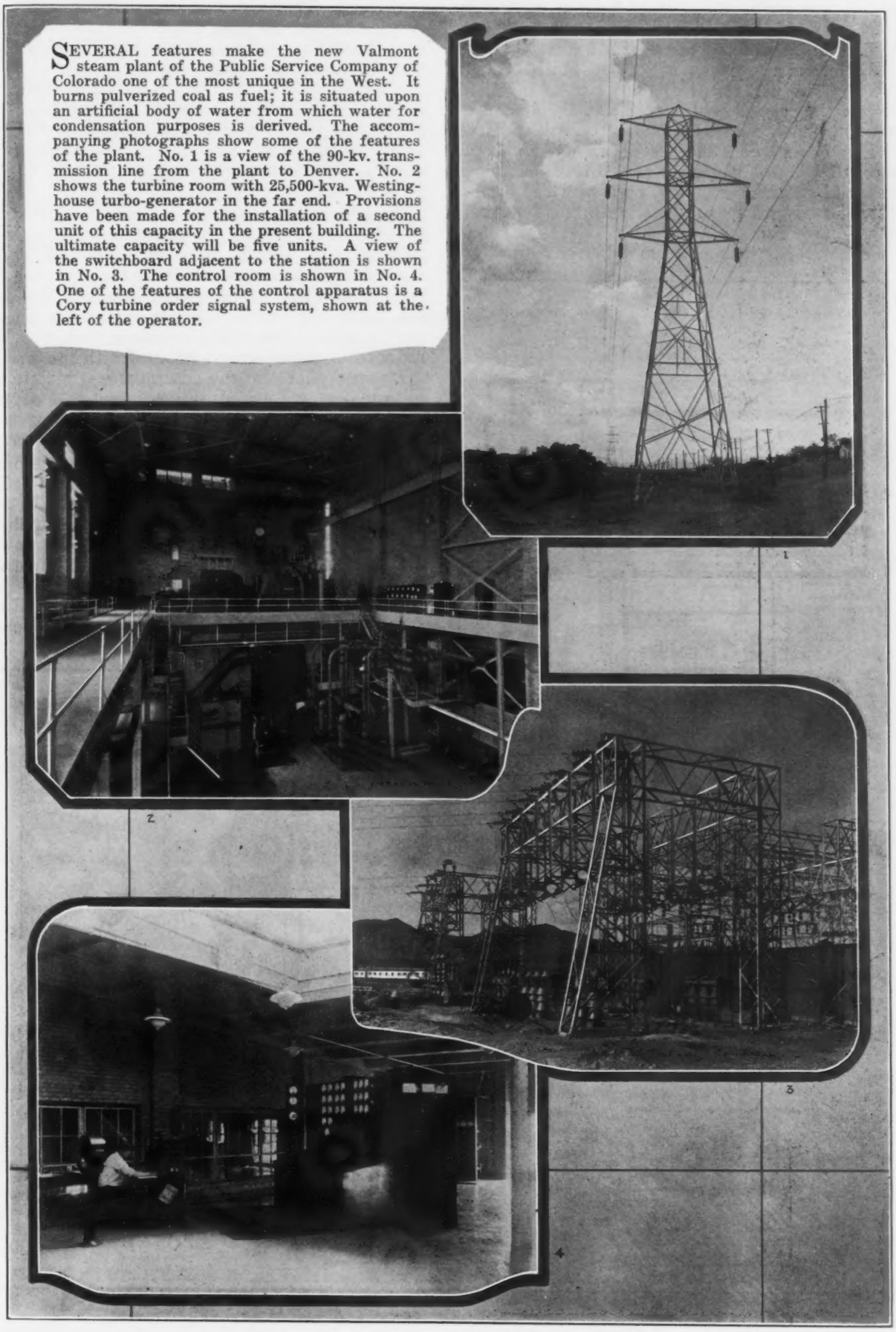
Boilers and Equipment

Coal is fired through the roof of the furnace through fantail burners set vertically at right angles to the front wall. Secondary air is admitted into the furnace through 96 openings each 7 x 9 in. in size. These openings are arranged in six zones. Each zone receives air through spring-controlled dampers set in the side walls and in the rear of the bridge wall.

Characteristics of the coal originating in mines within a radius of ten miles or so from the plant differ chiefly in their moisture content and ash proportions. The full flexibility of the fuel-burning equipment makes it possible to benefit by taking up attractive offers of coals of poor grade that have become more or less of a drug on the market. Prior to the decision to use these grades of pulverized fuel in the plant, exhaustive tests were made on the lignite to ascertain its value for fuel and its adaptability to pulverization. Several carloads of the intended fuel were shipped to existing pulzerization plants in various parts of the country and a detailed study made.

Four Bigelow-Hornsby unit-drum type boilers of 1,300-hp. normal rating make up the present battery.

SEVERAL features make the new Valmont steam plant of the Public Service Company of Colorado one of the most unique in the West. It burns pulverized coal as fuel; it is situated upon an artificial body of water from which water for condensation purposes is derived. The accompanying photographs show some of the features of the plant. No. 1 is a view of the 90-kv. transmission line from the plant to Denver. No. 2 shows the turbine room with 25,500-kva. Westinghouse turbo-generator in the far end. Provisions have been made for the installation of a second unit of this capacity in the present building. The ultimate capacity will be five units. A view of the switchboard adjacent to the station is shown in No. 3. The control room is shown in No. 4. One of the features of the control apparatus is a Cory turbine order signal system, shown at the left of the operator.



Each boiler has 13,200 sq.ft. of heating surface and is made up of 34 units per boiler exclusive of 10 units used as an integral economizer. A working pressure of 375 lb. and a superheat of 200 deg. F. will be maintained. The usual construction practice in setting the boilers was followed in that cold air is admitted through hollow side walls and carried to the front of the boilers where the heated air enters the furnace. Ashes and slag are removed to an ash pit by means of sluicing. Primary air is provided by four motor-driven Sturtevant fans, with one emergency steam-driven fan.

Feed water is supplied from either or both of two feed lines. This water is admitted into each end of a header serving each boiler and from which five 2-in. supply lines deliver water to the economizer sections. Regulating valves control the flow of water into these headers. The feed pumps draw upon the storage of deaerated water in the deaerator and pump through the 55-deg. bleed heater, and thence to the boiler units. Feed pumps are steam-driven while all of the other auxiliary equipment is electrically driven.

Water is required by the boiler room flows from a high-level surge tank, which collects all retrieved condensate as well as make-up water, and passes first through the air ejectors and then through the 140-deg. and the 200-deg. bleed heaters. The 200-deg. heater serves as a regulating heater under the control of a thermostatic regulator such that the outlet temperature when combined with the amount of steam available in the deaerator will maintain a uniform temperature at this point of 206 deg. F. This temperature is taken as the controlling temperature for proper deaeration of the feed water.

Each of the four boilers discharges steam into one main header serving the main turbine unit. Before entering the turbine room an anchored cross is provided which serves also as a portion of the auxiliary is taken. The other side of this cross will provide for cross-connection with other boiler units of future installations. A system of header drainage is provided which serves also as a portion of the auxiliary steam header. This arrangement allows the opera-

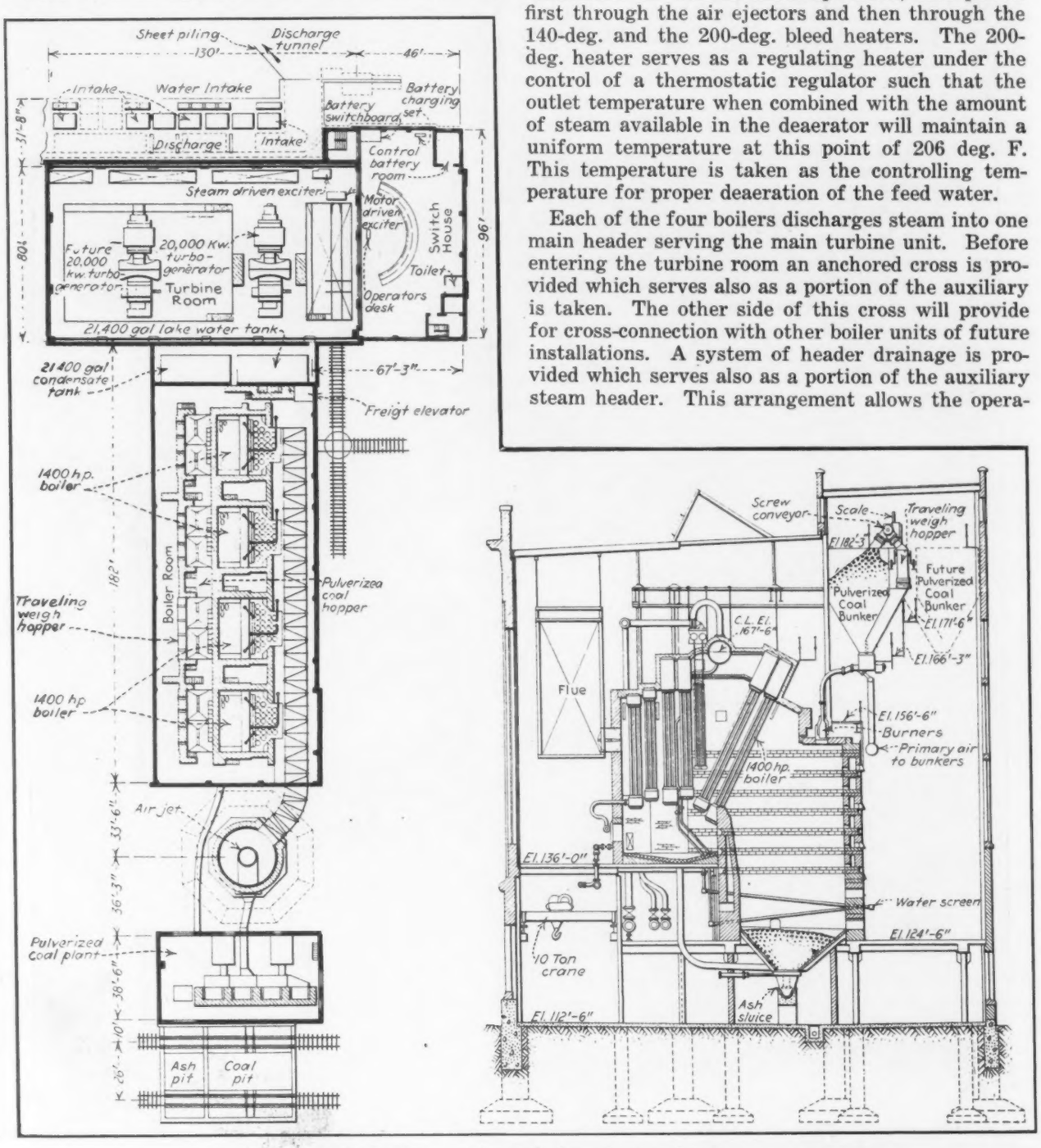


Fig. 1—Cross-section and plan of power house

tion of auxiliary equipment by any one boiler should such be necessary when the main steam header is out of service.

Circulating water equipment consists of two bi-rotor centrifugal pumps, one motor-driven and the other duplex-driven by steam turbo-gear and motor. Each pump is rated at 18,000 g.p.m. at 490 r.p.m. Condensate is removed by either of two centrifugal pumps, one of which is motor-driven and the other of which is steam-driven. Air removal equipment consists of a motor-driven LeBlanc air pump and also a duplex bank of steam-driven air pumps.

Burners

Choice of fuel-burning equipment was based upon the ability to burn Colorado fuel and upon ability to pick up sudden increases in load often ranging from floating capacity to fuel-generating capacity. Experience with every other type of fuel-burning equipment from hand-fired grates to the most recent developments in underfeeds and forced-draft chain grates proved that Colorado lignite cannot be burned with low ash pit losses to obtain more than normal boiler ratings. Underfed stokers proved their ability to accelerate at the rate of 10 per cent per minute, but their operation was at the cost of operating economy. Therefore, after weighing all considerations and in spite of higher initial investment, pulverized fuel-burning equipment was selected.

Turbine Equipment

The main turbine is a horizontal unit and designed to operate at a steam pressure of 350 lb. and a superheat of 200 deg. The bleeder system is used, four different stages of bleeding being used for feed water heating. In the process of heating, the feed water goes to the after condenser, to the low-pressure heater, to the intermediate-pressure heater, to a deaerator and open feed water heater in one unit. From this point water goes to equalizing tanks and then is fed into the boilers at a temperature of approximately 290 deg. F. through five-stage steam-driven boiler-feed pumps.

The condenser is attached rigidly to the turbine and provides 30,000 sq.ft. of cooling surface. It is served by two Westinghouse circulating pumps, each having a capacity of 20,000 g.p.m. One of these pumps is motor-driven and the other is equipped with a dual drive connected through a magnetic clutch. The condenser also is equipped with a Westinghouse-LeBlanc air pump for emergency operation.

Electrical Equipment

A 25,000-kva., 13,800-volt, 3-phase, 60-cycle, star-connected Westinghouse generator is driven by the main turbine unit. Excitation for the generator may be supplied either from a direct-connected exciter or from a 35-kw. motor-generator set and storage battery in parallel. The latter is for emergency service. Automatic voltage regulation is obtained by the use of a rheostatic voltage regulator operating in series with the main field. This allows a constant voltage to be maintained on the exciter bus and, while it is somewhat slower than the contact-making regulator operating on the exciter field, it is less sensitive to system disturbances and is believed to be more reliable. At present no load-limiting or synchronizing reactors are installed, but space for them has been provided on the first floor of the switch house.

Switching equipment for the 13,800-volt bus is located in a switch house at the end of the turbine room. All incoming and outgoing leads enter the switch house through the first floor, and consist of single-conductor, varnished-cambric-insulated cables laid in fibre ducts cast in concrete slabs. Outgoing leads and control circuits for the outdoor equipment leave the switch house through a cable tunnel built above grade through the outdoor switch yard.

It may be seen from the one-line diagram shown in Fig. 2 that the conventional, grouped-phase arrangement of a main and a synchronizing bus was used. Both buses are located on the third floor of the switch house. Three-pole, 25-kv., Westinghouse type C022 oil circuit breakers are used for all 13-kv. switching. As shown on the diagram referred to above, station light and power is supplied from a bank of three 1,000-kva. transformers located on the ground floor. This bank is large enough to carry the entire station load operating open-delta. These transformers step down from 13 kv. to 440 and 220 volts. The 220-volt connection supplies the starting bus only. All station auxiliary motors, including coal preparation and handling machinery, with the exception of the boiler feed motors, are supplied from this bank at 440 volts, 3 phase. Station lights are supplied through 440/220-110 volt, single-phase transformer. The boiler feeds are driven by 220-volt d.c. motors supplied from the station battery. Direct current for charging this battery normally is supplied from a 35-kw.

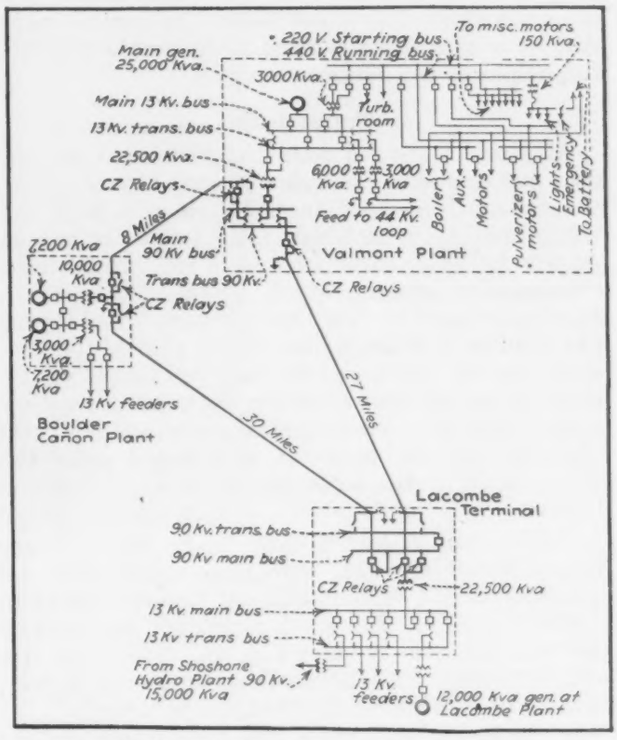


Fig. 2—One-line diagram of plant and contiguous system

motor generator set, but may be supplied from the exciter. Station lights automatically are thrown onto the station battery in the event of an interruption to the a.c. service. All auxiliary motors are push-button controlled and provided with "stay put" starting buttons so the motors will be restarted automatically after an interruption to the house supply service. The control board for the station auxiliary is located in the turbine room on the ground floor, just below the main turbine floor.

A bench type switchboard is located on the fifth floor of the switch house. From this board are controlled the generator 13-kv. breakers and the outdoor 44 and 90-kv. breakers. Private telephone connection with all points on the system is available as well as Bell connections and an inter-phone for house communication. Control and signal conduit terminate on a "half floor" just below the control room. Access to this space is from a shaft extending the full height of the house.

Transmission

All circuits are fed from the station to the outdoor bus structure through a conduit tunnel. There the voltage is stepped from 13,200 volts to 90,000 volts through one 22,500-kva. bank of transformers. At this latter potential current is fed into the main transmission system which supplies Denver and other communities. This same system is tied in with the Boulder Canyon hydroelectric plants, the Shoshone hydro plant on the western slope of the Rockies, and the Denver steam plants. The most important load point on the transmission system is the Terminal substation, which is situated some two miles inside of the corporate limits of the city of Denver.

The Valmont-Denver 28-mile, 90-kv. line is strung with 336,000 circ-mil. aluminum cable, steel reinforced, carried on double-circuit towers with 12-ft. vertical spacing. The same conductor was used on the 8-mile line to Boulder Canyon. The third side of the transmission triangle, from Boulder to Denver, is made up of a similar line 30 miles in length.

Seven 10-in. Ohio brass disk-type insulators are used in suspension strings and seven 11-in. disks are used for dead-end and semi dead-end strings. The maximum span is on the Boulder Canyon line and is 2,200 ft. long.

Two 44-kv. lines also take off from the outdoor substation and supply a 125-mile loop which furnishes energy to nine substations in northern Colorado where the power is distributed to cities and towns and other power users, such as mining and pumping installations. The 44-kv. bus is supplied from the 13,200-volt bus through two banks of transformers totaling 9,000 kva. The 44-kv. lines leave the plant on double-circuit steel poles and are carried on pin-type insulators. This twin-circuit line extends about three miles from the plant. From that point each line takes off to form its side of the above-mentioned loop.

The Denver terminal substation is an outdoor structure of up-to-date design and serves as the focal point of the system, the dispatcher being located there. The location is adjacent to one of the company's older steam plants. At this point the voltage is stepped down to 13,800 for distribution throughout the city to local substations.

General

Plant design was by the engineering department of the Cities Service Company of New York City under the direction of G. W. Saathoff. Local construction was carried on by the Lakeside Construction Company, a subsidiary organized especially for the project by the construction department of the Doherty interests.

The cost of the first unit was nearly $4,500,000. An additional $500,000 was spent on the transmission lines to the Boulder plants and to Denver. Water rights, ditches and other similar developments have cost another $500,000 to date. A total of 940 acres of land was acquired by the company for the project.

The first unit was placed in operation about the first of the present year and has operated unusually well for a new plant. It is being run at a capacity of 400,000 kw-hr. per day. The second unit probably will be placed next year. This unit will require no additional building or boiler installation as these already have been provided. The tentative program for next year also calls for the construction of the largest of the several dams required for the reservoir enlargement. This dam is to cost approximately $600,000 and will take about a year to construct.

Normal plant operation consists of all motor-driven auxiliaries except the feed pumps, yet the steam-driven equipment is sufficient to permit operation should system disturbances affect the station source of supply when the turbine unit is out of service.

Some effort has been made to insure a steady flow of energy from the plant as the following summary will show. Two railroads serving many miles supply the plant. The plant has a locomotive crane with a boom sufficiently long to permit it to place coal in the main bunker of the preparation house in the event that the main crane breaks down. There are four pulverizing mills, duplicate coal conveyors and multiple feeder units on each boiler. One of the primary air fans on the pulzerized coal feeders has been equipped with dual drive. Four boilers allow for plenty of capacity with one out for repairs. Feed pumps, circulating water pumps, condensate pumps and exciters all are in duplicate. The plant is connected to two loop circuits, the 90-kv. loop transmission serving Denver and the 44-kv. loop transmission serving the several cities of northern Colorado.

The plant is particularly fortunate in having a very good supply of make-up water for boiler feed. A connection for this purpose was made to the mains of the city of Boulder. This community obtains its water from a melting glacier, and diversion is made before the water has passed over anything more than granite rocks. This accounts for the absence of evaporators or feed water treating systems.

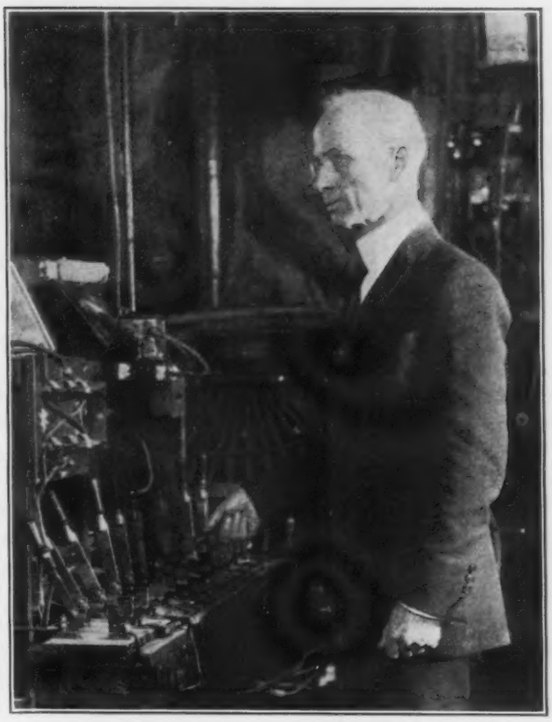
Future Electric Transmission

An Interview with Dr. Harris J. Ryan

By Andrew R. Boone
Stanford University, California

PICTURE one copper or aluminum wire, reaching from the Canadian border the length of Washington, Oregon and California to the Mexican boundary, passing the metropolitan areas close enough to be "tapped" and electrical power drawn off for Pacific Coast motors and electric lights

Idle dream? In essence such a great power line will feed the far West within the next two decades, for a rapidly growing population will demand development of all the first line water powers on the Pacific Coast. Steps are being taken now to solve the problems that the construction of such a line and the distribution of electricity in concentrated loads will present.



DR. HARRIS J. RYAN
who believes "that the time will come, perhaps ten or fifteen years hence, when economic necessity will require the development of all major water powers of the Pacific Coast. Utility companies will be called upon to serve concentrated loads of 1,000,000 hp. to metropolitan areas. We will have a single electric transmission extending from the Mexican to the Canadian border. We must solve the problems of that day now."

At Stanford University the Ryan Electrical Laboratory, built in honor of Dr. Harris J. Ryan, past president of the American Society of Electrical Engineers and head of the electrical engineering department there, will be installed this year. This is no ordinary laboratory. It will be capable of sending into a single pair of two-inch hollow conductors 2,100,000 volts of electricity. To date the largest power lines in practical operation carry electricity from Pit River to Vaca-Dixon for the Pacific Gas and Electric Company, and from Big Creek near Huntington Lake to Eagle Rock and Laguna Bell, for the Southern California Edison Company. Their normal voltage is 220,000, the highest in the world, yet little more than one-tenth the voltage to be played with in the unsightly buildings in a small valley south of the Stanford University campus.

Because unsightly, the laboratory virtually will be hidden from casual eyes. It will be located in the valley between Pine Hill and the Mayfield reservoir hill and will house six 350,000-volt transformer units, manufactured and given to the laboratory by the General Electric Company. Leading from these units will go a transmission line 8,000 ft. in length, 2 in. in diameter and hollow (hollow to facilitate measurement and to lessen weight and expense). A 300-ft. right-of-way will guard the unwary from its dangers.

Instead of the customary towers, a line of steel masts, each 125 ft. in height, will be erected on each side of the right-of-way. Cables will be strung from these masts so that the transmission line may be hung according to varying experimental demands. A telephone line will stretch the entire distance for communication studies. After the initial experiments are under way the experimental line may be increased in length to seven miles, skirting the edge of the 8,000-acre campus.

All for studying and getting ready for the Far West's electrical needs a few years hence. But why toy with 2,000,000 volts when practical needs will be limited to little more than one-eighth that total for many years?

"It is quite as important to learn that we cannot go beyond what we know today as the practical limits as to learn that we can handle the apparently impossible," Dr. Ryan explained.

"Laboratory voltages should be studied beyond the practical limits in order that we may familiarize ourselves with those things which might put an operating power line out of operation and throw the Pacific Coast into darkness. In lines carrying more than 220,000 volts (at 60 cycles) the magnetic and electric fields become too big; to mobilize these fields would require station capacities too great.

"To handle operating voltages successfully, we must be able to take care of all predatory, unexpected actions. Lines must be insulated and maintained for voltages several times as high as the normal operating voltage. For instance, the two heavy lines leading from Pit River and Big Creek were attempted only after 220,000-volt equipment was tested and studied in a laboratory with voltages up to a half-million, to insure safety.

"To bring power to San Francisco from the Colorado River region will require voltages higher than 220,000. In such a laboratory as ours we will study all the possibilities by which higher voltages may be employed.

"The time will come, perhaps ten or fifteen years hence, when economic necessity will require the development of the major water powers of the Pacific Coast. Utility companies will be called upon to serve concentrated loads of 1,000,000 hp. to metropolitan areas. The interconnection of all large operating companies will come as a natural consequence. We will have a single huge electrical power line extending from the Mexican border to the Canadian boundary, with 'tap-ins' from local water powers and 'tap outs' to customers who wish to buy current. We must solve the problems of that day now.

"Sixty per cent of the available water power of the United States is located on the Pacific Coast and the adjacent back country. The sources of these corresponding water powers generally occur at the highest elevations, often 100 to 200 miles or more from their corresponding market centers.

"The growth of Pacific Coast populations, their markets for power and their distance from the water power sources are all interdependent factors. It is a reasonable assumption that by 1935 all of the water powers within economic reach of the bay region will have been developed and put to use, employing a transmission voltage of 220,000. While the metropolitan areas of Los Angeles, Portland and Seattle are within economic reach of the huge water-power reserves of the Colorado and Columbia Rivers, the strength of the entire far West will be required to develop and market them.

"Such undertakings can be realized only through interconnection of all great powers and markets generally throughout the far West. These interconnections will require far greater transmission distances than those heretofore accomplished.

"The progress of the far West is extraordinary and has been made possible only through economic power and communication. If such progress is not to be greatly reduced after ten years, adequate corresponding advances must be made in the technical knowledge of the high-voltage factors involved in the general interconnection of the power sources and markets. It is the manifest duty, therefore, of all responsible for the progress of the power industry of the far West to cooperate in educating and training the men and accomplishing the researches requisite for the development and application of the adequate knowledge required to accomplish effectively and economically the entire power market interconnection throughout this vast section of our country."

Professor Ryan sees little reason why some method for handling heavier electrical loads canont be worked out. One of the first questions to be decided is whether "we shall increase the voltage, lower the frequency or change from alternating to continuous current."

The possibilities of general Pacific Coast interconnection of power sources and markets first were visualized following experiments in the present Stanford high-voltage laboratory, now outgrown. After the suspension-type insulator for 110,000-volt power lines proved successful, Stanford erected the present laboratory in 1913, and in it five years ago were begun a series of researches, the outcome of which provided a successful insulator for the 220,000-volt lines. Before the 220,000-volt problems had been solved, the insulator for the 165,000-volt lines of the Great Western Power Company, from Big Bend to Oakland, and the first 100,000-volts to earth insulating supports for the radio aerial at Pearl Harbor, T. H., were developed in this pioneer laboratory in cooperation with the engineers in charge of those projects.

During the last decade these and other researches brought about a closer cooperation between Stanford and the power companies, leading to establishment of the Ryan Electrical Laboratory, a tribute to Stanford's electrical genius.

Through researches, in cooperation with the electrical engineers of all the large power companies, and graduate students at Stanford, Dr. Ryan hopes to learn how to develop all the water power of the far West and bring the power to market—despite great losses of power incidental to transportation over long distances in varying weathers and to "predatory high-voltage phenomena, among them switching, breaking short circuits, arcs, engine or turbo-generator runaways, resonance, lightning, too-small conductors, failure of insulators and flash-overs."

To date the conclusion is that the best transmission voltage is 220,000, the present maximum, with which power can be transmitted satisfactorily over distances varying from 250 to 500 miles and more.

As to the possible availability in the future of high continuous voltage of 500,000 or more, "an open mind should be maintained," said Dr. Ryan. "Responsible manufacturers are engaged in the solution of this problem," he explained. "We may expect them to be successful, but with some changes in the method of distribution.

"Whatever success we achieve will be based partially on experiments in the new laboratory, which will be a light-proof building. The main laboratory building will be constructed entirely of steel. Its length will be 173 ft. and width 80 ft. The roof will be supported on trusses so as to leave the interior free of supporting columns. The height from the concrete floor to the underside of the trusses will be 50 ft. The long sides of the main building will face north and south. The side to the south facing the line right-of-way will be equipped with three large square doors measuring 40 ft. on each side, out through which to extend the high-voltage source-terminals for the delivery of 2,100,000 volts single-phase, 1,200,000 volts three-phase, and lesser voltages by arrangement as required.

"Fifty feet of the west end of the main building will be occupied by the equipment now used in the old laboratory. Its use will be continued for elementary instruction and for researches requiring the use of comparatively low-voltage sources. The rest of the main building using a floor space of 120x80 ft. will be employed for placing and using six 350,000-

volt transformer units. They will weigh 22 tons each and have been so designed and constructed that they may be used in every manner of connection for the whole range of voltage, single or polyphase, within the limits named above.

"For safety to life and equipment in the use of these high voltages it has been found necessary to provide 20-ft. clearances everywhere about the main electrodes and corresponding points of application of the voltages to avoid discharges or destructive arc-overs. This is the chief reason for the large doors through which to connect to experimental lines or other test specimens in the open and for the large interior space for work indoors.

"Adjacent to the north side of the main building there will be erected a much smaller building of concrete to contain the requisite power plant, power and voltage control facilities, offices and instruments, equipment, photographic dark and seminar rooms. The power plant will contain two 900-kva. sine-wave, three-phase generators driven direct-connected by two 500-hp. synchronous motors. While the maximum power capacities are large—2,100 kva. in transformers, 1,800 kva. in generators and 500-hp. in motors—the total annual cost for power consumed will be comparatively small because of the short duration through which large amounts of power will be required for study and test purposes.

"In anticipation of the provision of this high-voltage laboratory at an early date, the faculty and graduate students of the department of electrical engineering during the past three years have been engaged steadily upon the problem of the development of a satisfactory wattmeter for the segregation and measurement of the power losses that will occur from the 1,000,000-volt, three-phase circuits to the atmosphere and over the supporting insulators. Excellent progress has been made in this undertaking, and the final success of the 1,000,000-volt three-phase wattmeter used in direct connection with the test lines now is reasonably well assured. Such wattmeter stands in much the same relation to the high-voltage laboratory as does the precision reflector telescope of the modern astronomical observatory."

The Same Job—A New Crew

By William Baurhyte

President, Pacific Coast Electrical Association

THE aims and policies of the Pacific Coast Electrical Association are so firmly established and well understood among our membership that a change in Association officers does not imply an annual revision of purpose or turning aside from the proven path to chase the butterflies of individual caprice across the inviting meadows of unconsidered experiment. It is not the annual tearing down of what was built last year in order to erect a new structure of different design on the same ground. Rather, it is a change of shift on a big job—one crew has gone home for rest and recreation; another crew has taken up the tools of the task, to be relieved later by still another crew, yet unchosen. Different crews, but the same job and the same general design.

WILLIAM BAURHYTE
who tells of his aims for the Association which he leads during the present year.

Therefore the plan of the newly elected administration will be to carry on the work of the Association and promote the advancement of the industry along the lines so successfully followed last year under the very able leadership of Frank A. Leach, Jr., our retiring president. We shall seek to develop and strengthen every branch of Association activity, in the confidence that conscientious effort along right lines will yield the golden fruit of success to our industry and satisfying service to the great public for which we carry on.

The work of the Association is done largely by the various Sections called for by our plan of organization. The membership of the committees composing these Sections totals approximately 600, all experts and specialists in their lines. Most of them are already vigorously at work. To each Section is committed its own special task. What they shall accomplish during the year is beyond the present knowledge of the president and largely outside of his control. From the nature of the case, the Sections specialize while the president must generalize. Our reliance and confidence rest with the Sections.

Some of the tasks confronting the Association may be stated in a general way.

We hope to increase our membership and build up the organization to keep pace with the growth of the industry.

The Technical Section has the task of improving service and providing it at lower rates. Great improvement has been made recently in steam-driven apparatus. Strides have been taken in the transmission of electricity at high voltage, and experimental work is still in progress. Central-station companies are making great expenditures for water power development to the end that the community may be served adequately and efficiently.

Recent improvement in alternating motors greatly has diminished the necessity for direct current. Economy of operation and the consumer's interest both lie in the direction of keeping the demand for direct current down to the minimum. Sales and engineering forces, both in the central stations and among the dealers in motors, should not be permitted to lose sight of this fact.

The greater use of combination poles is to be encouraged. One step in this direction would be taken if arrangements could be made with the telephone companies that higher voltages might be combined with telephone lines. This same problem is under attack in the East.

Standardization of apparatus and uniformity of current characteristics are highly desirable as a means of facilitating super power, with its economies and assurances of uniform service.

One of the most unfortunate things that has happened to the electrical industry in recent years is the public misunderstanding of the purpose of the power companies in their efforts to achieve superpower and the accompanying unfavorable publicity. The consumer's interest lies parallel to that of the central-station companies in the encouragement of superpower development. The Association must find a means of nullifying this unfavorable publicity.

The increasing importance of courtesy as an accompaniment of service is receiving more nearly its due recognition in all quarters. The success of the "Smiles" movement, the preparation and use of manuals for employees, and the emphasis placed on courtesy in hundreds of spoken and written discussions all testify to the interest being taken in this vital subject. Good service at a fair rate, courteously rendered, is the basis of all opposition to municipal ownership.

Our Public Relations Section undoubtedly will continue the good work already done in the interest of customer-ownership. As a happy combination of financial and public relations policy, customer-ownership constantly is giving fresh evidence of its value to utility corporations so that on the Pacific Coast at least the problem is not that of interesting company executives in customer-ownership, but rather the development and refinement of the methods of its application.

The Public Relations Section is very fortunate in the fact that A. B. West, president of The Southern Sierras Power Company, has accepted the chairmanship of the Section and will take an active part in that very important Section. The Association is to be congratulated that Mr. West is again able to assume his place as one of its active workers and supporters.

The Commercial Section made an excellent record of accomplishment last year, and the prospects are that the present year will measure up fully to that standard. As public servants charged with the obligation to give the best possible service at the lowest possible rates, we shall have constantly in mind the necessity of the fullest cooperation and co-ordination of aim and effort on the part of the manufacturers, the dealers and the central-station operators. The field of usefulness for electricity is almost unlimited, and it is for us to overcome the obstacles now preventing its wider uses. Cheaper appliances must be found in some instances, cheaper current furnished in others, and proper education alone in many others. With every branch of the industry working in harmony we shall succeed in making it the ever-increasing boon to humanity that it is destined to be.

The selection of a Pacific Coast man as president of the National Electric Light Association and the holding of the national convention here in June were together a compliment which has given a great impetus to our work and left a train of benefits impossible to estimate.

California Ranks Second in Developed Water Power; Washington, Third

THE Department of the Interior, through the Geological Survey, has just released a report on the developed water power of the United States in 1925. The total capacity of water wheels installed in plants of 100 hp. or more, in March, 1925, was about 10,038,000 hp., an increase of about 951,000 hp., or nearly 10½ per cent, over the total capacity of water-power plants in 1924 (9,087,000 hp.). Of this increase 99 per cent was in electric public utility plants and 1 per cent in manufacturing plants.

New York continues to lead the rest of the states in the amount of developed water power. The five leading water-power states in order of their rank and the amount of developed water power for each are as follows: New York, 1,713,551 hp.; California, 1,531,480 hp.; Washington, 560,693 hp.; North Carolina, 534,600 hp.; Maine, 476,627 hp. North Carolina has moved from fifth place in 1924 to fourth place in 1925.

The report also contains records of the developed water power for 1924 and 1921 and the estimates of potential water power for 90 per cent and 50 per cent of the time computed in 1924. Based on present practice at fully developed water-power sites the undeveloped water power in the five states leading in developed water power will permit of the installation of the following additional capacities in water wheels: New York, 4,734,000 hp.; California, 7,145,000 hp.; Washington, 9,672,000 hp.; North Carolina, 526,000 hp.; Maine, 920,000 hp.

The report indicates that water-power development in the middle Atlantic, south Atlantic, and east-south central states is progressing more rapidly than in any other sections of the country. New England's relative standing continues to decrease.

Dough—Kilowatt Hours—Dollars

By E. L. Gehman

Manager Rainier Electric Oven Department, J. A. Campbell Company, Seattle

A growing load in the territories of Western utility companies, but one still in its infancy, is that of the bake oven. The potential business has been only scratched. Mr. Gehman has been one of the pioneers on the Pacific Coast in developing this business, and here presents some ammunition to supply the oven and power salesmen in their attacks on the bakers' strongholds when attempting to introduce electricity into an old-fashioned bakeshop.

IT is said that in 1825, when a bill for the construction of the first railroad line in England was introduced in the British Parliament, one Thomas Creevey, expressing the popular sentiment of the day, objected as follows: "I have come to the conclusion that our Ferguson is insane. He quite foamed at the mouth with rage in our railway committee in support of this infernal nuisance—the locomotive monster, carrying 80 tons of goods, and navigated by a tail of smoke and sulphur coming through every man's grounds between Manchester and Liverpool. . . . Well, this devil of a railway is strangled at last . . . today we had a clear majority in committee in our favor and the promoters of the bill withdrew it and took their leave of us."

It has been written that at the time that bathtubs first were installed in this country, about 1840, the newspapers were bitter in denouncing them as extravagant and undemocratic, and even doctors criticized them as being unhealthy. Disapproval finally led to legislation to the extent that special licenses and taxes were attached to the unsuspecting bathtub. It is claimed that Virginia put a tax of $30 a year on them in 1843 and that two years later an ordinance was enacted in Boston making bathing in them unlawful except as prescribed by a physician.

Ridicule always has been a popular and handy weapon. It might have caused an early death or at least a much arrested development of the electric bake oven but for the vision and enthusiasm of a few. As recently as three years ago a great many bakers took the attitude that electric ovens were toys and wholly impractical for all heavy-duty work. Today there are thousands of them in use in all kinds of bakeries.

The Bake Oven a Desirable Load

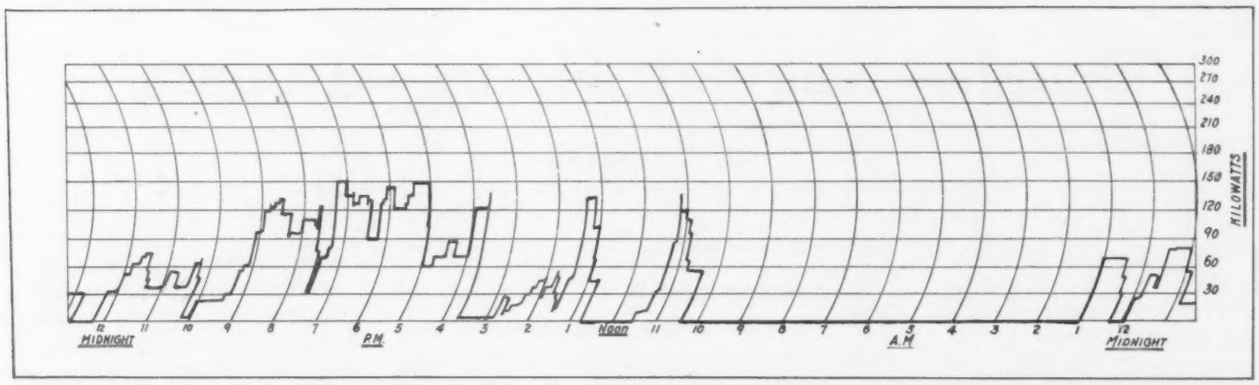
To the central station this electric bakery load is an important factor. Progress in the development of this class of installation has been made, and indications are that greater attention will be paid to it in the future. System load factor is bettered by this load, which is largely of an off-peak character, and its revenue-producing qualities give it increasing importance in the eyes of commercial department managers.

W. R. Putnam, last year's chairman of the Commercial National Section of the N.E.L.A., recently said in part: "The most urgent problem confronting central station men is that of so directing their load-building efforts as to raise the system load factor, and by this increased efficiency offset the higher unit investment cost and increase in operating expenses." A writer in the March 21 issue of Electrical World stated, "Commercial electric cooking load is particularly desirable to the central station because the load factor is as good as and often better than the average industrial load, and it operates practically at unity power factor." If this is true of commercial cooking, it is even more true of electric baking, a specialized branch of cooking, as most baking is done during off-peak hours, thus improving load factor and tending to fill in the daily valleys in the load curve.

The Electrical Oven Desirable from Baker's Standpoint

In addition to being a particularly desirable load to the central station, the electric bake oven is an especially desirable and modern facility in the bakeshop. It can be said truly that the electric bake oven is to the baking industry what the automobile is to transportation. The electric bake oven has met the stiffest requirements of both the retail and wholesale baker. It is manufactured in sizes ranging from the small laboratory oven to the traveling oven designed to meet the demands of the largest wholesale baker. Illustrative of the practicability of the electric traveling oven for the larger plants is the recent installation of one of these in the new plant of the Bake-Rite Bakery, Portland, which makes a diversified line of bakery goods, including everything from lady fingers to three-pound loaves of pullman bread. The electric traveler allows the large baker the advantages of electric baking and combines these advantages with those of the traveling oven, an ideal combination. No special costly foundation is required for the electric traveling oven, while this item alone represents a considerable investment in the case of traveling ovens of other types.

For one of the world's oldest lines of business, baking has been very slow in its progress and improvement. It is only within the last few years that great strides have been made, and this has been the result of scientific study. This advancement has attracted a more intelligent type of men to the baking



Graphic demand record of Rainier electric traveling oven at Bake-Rite Bakery, Portland. The oven has a baking surface 60 in. wide and 45 ft. long and a capacity of 1,320 loaves an hour. Average cost of baking a 1-lb. loaf is $0.00119.

field, men with higher ideals and better trained in merchandising, who were quick to realize the place of importance the oven holds in the shop. They have realized that it is the most necessary piece of equipment in the bakery—the only one they **must** have to operate a bakery. Now that the prominent part the oven must take in the successful operation of a bakery is being appreciated, it is receiving more consideration from the practical baker.

Keen competition is responsible for the necessity of cleanliness in the shop, and since the old types of ovens are the cause of most of the uncleanliness, it is the exception, rather than the rule, for a baker to omit consideration of an electric oven, when he is opening a new shop or buying a new oven. The only objection to the electric bake oven, in the mind of the baker, is the cost of operation, and there is hardly a baker who would not install an electric oven on account of its cleanliness alone in preference to any other type, if the operating costs were apparently equal. The truth is, however, when all things are considered, the use of the electric oven actually effects a saving.

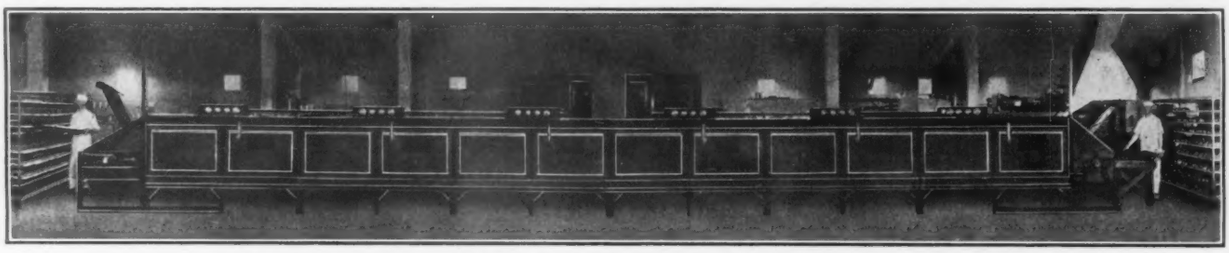
The High-Cost-of-Operation Myth

The baker must be convinced that no fuel oven at any price can furnish service equal to that rendered by the electric bake oven, and that an oven of another type **cannot** render this service, regardless of a higher or lower operating cost. He must be convinced that the slightly increased fuel bill each month is more than offset by the efficiency of the electric oven, by the smaller floor space it requires, by the labor it saves in eliminating dirt, ashes and the cleaning of flues, by the ease with which the heat is controlled, by the saving in ingredients—an important one—and by the prestige its use gives the baker in the minds of the public.

Electric bake ovens will produce more goods per square foot of baking surface than any other oven. As the heat is under absolute control of the operator at all times, unsalable goods or cripples can be eliminated entirely. The electric oven is in every sense a continuous baker, with heat applied where and when it is needed. An example of the efficiency of the electric bake oven may be had from an installation made in Tacoma. Prior to using the electric oven, which has about 160 sq.ft. of baking surface, the baker used two brick ovens, having a combined baking surface of about 240 sq.ft. Although having a smaller baking surface, the one electric oven now does the work of the two brick ovens and takes less time to do it.

To the baker who leases a shop in the retail shopping district of a large city, where rents are high and where every square foot of floor space must be put to use wisely, the electric oven solves his problem. The baker should be shown that, strictly speaking, the cost of operation of any oven should be based not only on the fuel bill each month, but to this should be added its proper proportion of the month's rent, this to be based on the number of square feet of floor space the oven occupies. In the case of fuel-fired ovens rent on the firing alleys also should be charged. In most cases these charges alone will more than offset the slightly higher cost of operation of the electric oven.

In this connection there is the circumstance that was responsible for the installation of an electric oven in Sebastopol, Calif. The baker was using a gas oven that was not giving a satisfactory bake and as a result watched his sales steadily decline. Realizing that his oven was responsible for this decline, he concluded to install a fuel oven, after a casual investigation of electric ovens had convinced

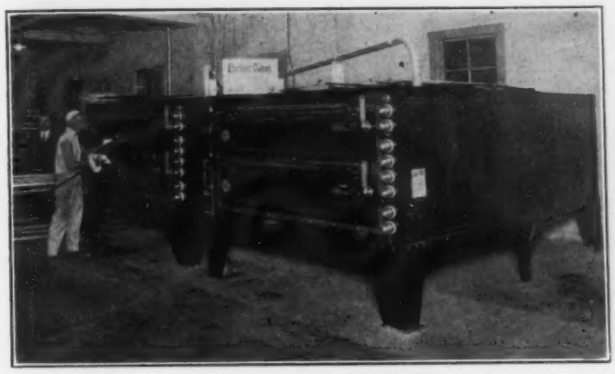


A Rainier electric traveling oven, nearly 60 ft. long, in use at the Bake-Rite Bakery, Portland, Ore.

him that their cost of operation made them prohibitive. His shop space was so limited that he could not find room for the installation he desired, so he proposed to rent space on an adjoining lot for his oven and firing alley, with just the face of the oven in the bakery. When the cost of operation of electric ovens was explained to him and it was pointed out that the cost of firing his fuel oven plus the additional rent would equal the cost of operating the electric oven he lost no time in ordering the latter.

Operating Characteristics

Experience has shown that in the pre-heating period the rated demand in kilowatt hours is consumed by the electric oven. In other words, a period of approximately one hour with switches on "high" or two hours with switches on "medium" is required to



Two electric ovens at Sutton's Bakery, Visalia, Calif. The ovens have a maximum demand of 100 kw.

bring the oven up to bread-baking temperature. After this pre-heating period, it can be used continuously for diversified baking with an average hourly current input of 50 per cent of the maximum demand and about 60 per cent of the maximum demand when bread exclusively is baked. Economy of operation may be said to be entirely up to the operator. A careless baker will require twice as many kilowatt-hours for baking a given amount of goods, as will one who arranges his work systematically and operates his oven accordingly.

The Royal Bakery of Twin Falls, Idaho, recently submitted its operating chart covering a four-month period. While this bakery does not compare in volume of output with some of the larger plants, it is known for its thoroughness in keeping accounts and records. For this reason it is believed that the figures submitted are complete and accurate in every respect. These figures show an average baking cost per thousand loaves over the four-month period of $1.47. Energy is purchased under a flat rate of two cents per kilowatt-hour. The daily output is from 1,500 to 2,000 loaves. In localities where rates are lower, or installations of a larger size earn a lower average rate, this cost can be reduced to as low as 87 cents per thousand loaves.

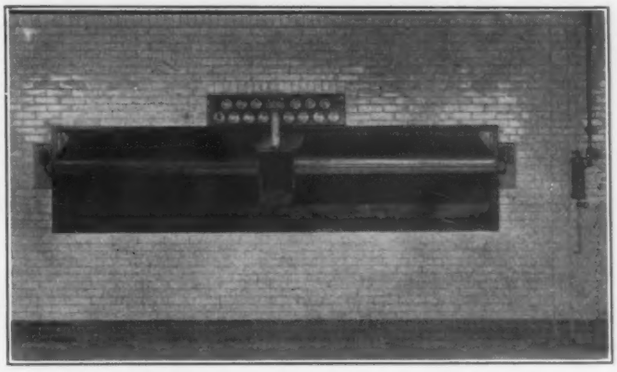
The B.t.u. Bugaboo Routed

In selling electric bake ovens in competition with gas ovens the question of B.t.u. often is encountered as this is among the best sales arguments of the gas man. The average baker does not know any more about B.t.u. than the average power salesman does about bread fermentation, but when the gas man tells the baker how many more B.t.u. there are in a dollar's worth of gas than in a dollar's worth of electricity the baker is bound to listen. In this connection it should be borne in mind that it is just a question of efficiency, and that B.t.u. have but very little to do with cost of operation.

Coal has more B.t.u. content than any other common fuel, but its efficiency is low when used in any kind of an oven. Too many B.t.u. are lost by radiation and too many escape up the flues. Oil engineers figure that fuel oil will average 126,000 B.t.u. to the gallon. Yet one engineer claims a combustion efficiency of only 15 per cent for oil. A somewhat similar statement would be true of gas-heated ovens, there being only a small percentage of B.t.u. in 1,000 cu.ft. of gas converted into useful work.

A fair estimate of the efficiency of an electric bake oven is 90 per cent. This same percentage of efficiency is not claimed for all electrically heated appliances, but the electric bake oven is particularly adaptable to high efficiency. A kilowatt-hour contains only 3,412 B.t.u., but nearly all of this heating capacity is utilized. In other words, Mr. "Baker", in operating his electric oven, is benefited by 90 per cent of the B.t.u. he buys, while with other types of ovens he can utilize but a small percentage of the B.t.u. for which he pays.

In a recent issue of one of the electrical magazines the Commonwealth Edison Company is said to have 110 installations of electric bake ovens and heavy-duty ranges on its lines in Chicago. With this statement in mind, it is somewhat interesting to



Single-deck electric bake oven, 12x14 ft. inside dimensions, at Golden Rule Bakery, Seattle

learn that there are 130 electric bake ovens alone in operation in Seattle. It is hoped that the reader will not get the impression that all the bakers in the Northwest are discarding their old ovens and fighting for electric ovens. Electric baking load has been developed by the same system that has built other loads—by 99 per cent PERSPIRATION—and by very close cooperation between manufacturers and central stations. The same whole-hearted cooperation in other territories will assure similar results. With a vision of the possibilities and a little enthusiasm there is no reason for anything short of the best kind of success.

CENTRAL STATION CONSTRUCTION OPERATION AND MAINTENANCE

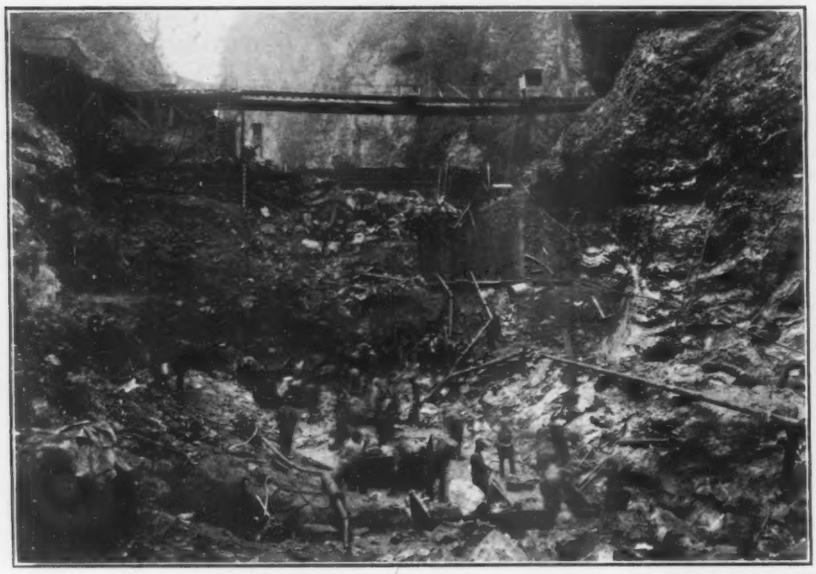


Fig. 1—An upstream view of the excavations for the Baker River dam early in the course of construction

Baker River Dam Presents Difficult Problems

Several Unusual Features Involved in the Construction of Puget Sound Power & Light Company's Project

By W. D. Shannon, General Superintendent, Division of Construction and Engineering, Stone & Webster, Inc., Seattle.

The Baker River dam, now under construction as a part of the Baker River development for the Puget Sound Power & Light Company, Seattle, is of the semi-gravity arch type with spillway through control gates over the crest of the dam. The upstream face of the dam is laid out on a radius of 250 ft. and the entire cross-section of the dam likewise is swung on the same center.

The dam is approximately 150 ft. across at the river level and the length of the crest is approximately 400 ft. The crest of the dam is divided into spillway sections 10 ft. in width in the clear. These sections will be separated by piers 18 in. wide and 25 ft. high which will be slotted and fitted with 10 x 12-ft. gates. These gates will be raised and lowered by a mechanical device which travels on the top of the piers. Gates can be kept open during the flood periods of the river and so operated during the low water period that the water in the reservoir may be conserved. The total height of the dam will be 258 ft. from bedrock to the top of gate piers, or 234 ft. to the spillway crest.

The lower portion of the dam is constructed on a vertical curve of 106-ft. radius. This curve is tangent to the apron. The total width of the cross-section of the dam at the point of maximum depth, including the apron, is 180 ft.

The dam is located at the upper end of the Baker River canyon, which is a gorge of nearly vertical sides and over 300 ft. deep. The ridge through which the river has been cutting its way for ages is of limestone foundation with occasional strata of shale. The bed of the stream is of solid limestone and cut up more or less with pot holes and ridges, the harder strata of limestone resisting the erosion, of course, more than the softer rock. This effect results in a roughened condition of the stream bed, making possible an excellent bond with the masonry of the dam.

Bedrock was found over the entire bottom of the dam at an average depth of 35 ft. below the bed of the river. Before excavation for the dam could proceed it was necessary to drive a diversion tunnel 17 ft. by 24 ft. in cross-section from a point some 200 ft. above the upstream face of the dam to a point 300 ft. below the downstream face. The intake for the diversion tunnel was driven well below the bed of the stream, so that when the final shot was made in the rock wall separating the tunnel from the river bed, over two-thirds of the stream flow was diverted. A map is shown in Fig. 4.

As soon as the diversion tunnel was placed in use the work of constructing the upstream cofferdam was begun. This structure was built of 10x10-in. timbers laced together both longitudinally and transversely to the stream. The crib work was divided into two portions. A double crib on the downstream side and a single crib on the upstream side were filled with rock. The space in between these two sections was

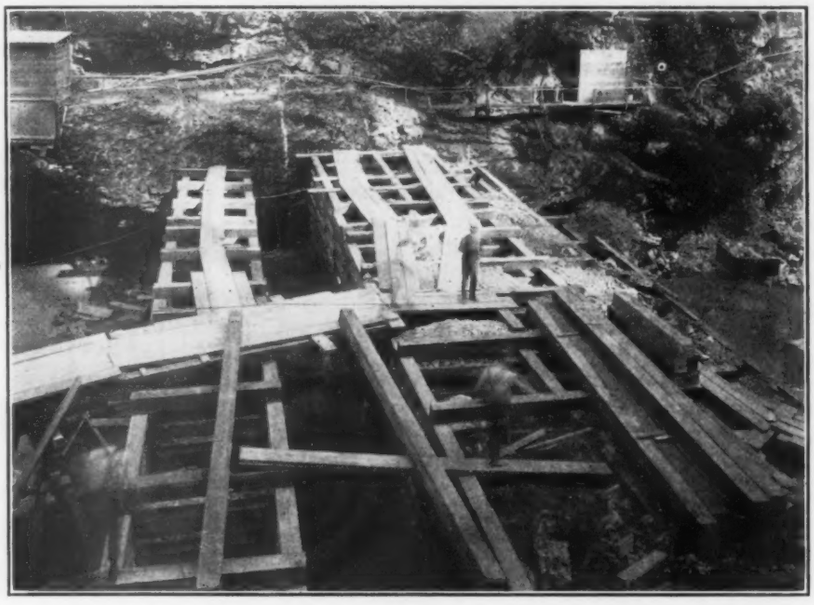


Fig. 2—Upper cofferdam showing the clay puddle chamber used as a water seal

Fig. 3—Downstream face of the Baker River dam as it appeared about May 1. The openings shown are for temporary use to pass the river flow when the temporary diversion tunnel is sealed off. They may be closed up when it becomes necessary to fill the reservoir

puddled with clay. The puddle chamber was lined first with 2-in. planking. This whole arrangement made a very tight dam that successfully withstood several floods and made possible the pouring of concrete in the upstream portion of the dam. This is shown in Fig. 2.

Some of the floods of around 25,000 sec.-ft. washed out sections of the crib after the concrete had well covered the bottom, making it necessary to reconstruct portions of the crib after the severest floods. One particularly heavy flood finally took out the whole crib, but this occurred at a time when it was necessary to replace it with only a low structure of simple design, the masonry in the dam then being almost up to the river level.

The downstream crib was never any more than a simple structure. At first a triple crib was constructed, the two outside ones being filled with rock, and the inside one with a clay puddle. During the latter stages of construction a sack dam was all that was required to keep the backwater of the river from encroaching on the excavation.

Owing to the great depth of boulders in the stream bed, the leakage from the upstream cofferdam during the earlier stages of construction was considerable. The water was picked up from successive pools just inside the cofferdam, the leakage from each pool growing continuously smaller. The large pumps were of the 10-in. single-stage centrifugal type, direct-connected to 200-hp., 700-r.p.m., 2,300-volt a.c. motors. There never were more than three of these pumps in service at any one time.

In addition to the large pumps, there were a number of 8-in., 6-in. and 4-in. pumps, all direct-connected in such a way that they could be removed quickly in case of flood danger. Owing to the numerous fluctuations of the river it was necessary to take out the pumps and piping completely a number of times before the concrete finally was placed up to the level of the upstream cofferdam.

The last winter season on the Baker River was extremely wet, rainfall in January, 1925, alone being 15 in. Other months from October, 1924, to February, 1925, had rainfall nearly as great. The construction forces therefore had only short periods of time between floods to excavate small portions of the river bed and to place concrete. The masonry reached the level of the upstream cofferdam, El. 201, on March 1, 1925. This entirely shut off the river flow and since that time the placing of concrete in the balance of the structure has been comparatively simple.

Three temporary openings 12 ft. by 20 ft. have been left in the dam to take care of the river flow after the diversion tunnel is closed. The closing of these openings will start the filling of the reservoir.

The construction plant is placed 350 ft. above the bed of the river so that all concrete is placed entirely by gravity. Two lines of chutes extend from the plant to the dam, the total chute capacity being 150 cu.yd. of concrete per hour. Three 1-yd. mixers supply concrete to the chutes.

Sand and gravel are taken from the river bed about one-half mile upstream from the dam and after washing and screening are hauled by an incline railroad to bunkers above the mixers. Cement likewise is taken from cars above the mixers and carried to the mixing platform by gravity on inclined belts. The mixing operations are controlled by telephone from the forms at the dam. Storage capacity of 750 cu.yd. handled by derricks is within 300 ft. of the bunkers. However, the gravel incline is in continuous operation.

A total of 60,000 cu.yd. of concrete had been placed in the dam up to May 30. This is about two-thirds of the entire structure. It is expected that the dam will be completed in ample time to catch the fall runoff of the river basin.

The work of design and construction of the dam, as well as the entire project of the Baker River development, is being carried out by the Division of Construction and Engineering of Stone & Webster, Inc.

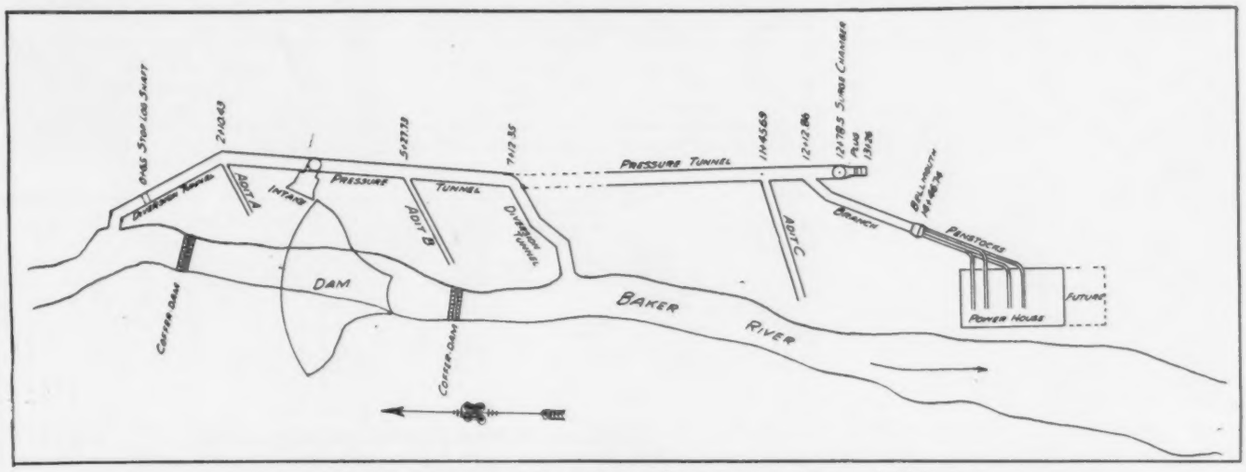


Fig. 4—Sketch map of the Baker River project of the Puget Sound Power & Light Company

Special Recording Meters Write Station Log

Operations of Automatic Railway Substations Accurately Plotted by Specially Constructed Meters

By E. W. COOK, Electrical Department, Pacific Electric Railway Company, Los Angeles

Automatic control for electrical machinery is being developed and applied wherever practical. One of the principal developments along this line in recent years is the control of rotating machines in railway substations and small hydro-electric stations.

A large percentage of city and inter-urban railway cars is equipped with motors that operate on between 500 and 1,200 volts d.c. As it is not economical to transmit the amounts of power required at these voltages, it has become general practice to use a.c. transmission

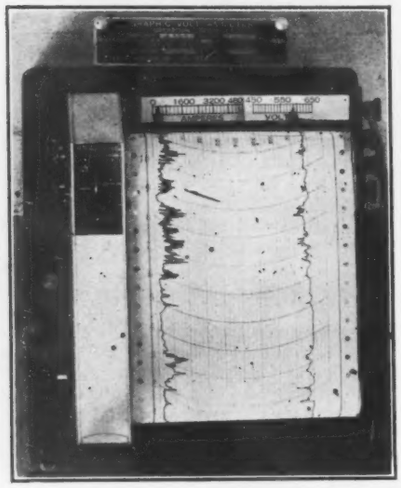


Fig. 1—Graphic recording meter at Vineland automatic substation of the Pacific Electric Railway Company near Los Angeles. This meter shows a permanent record covering ampere load on the station, voltage at the station d.c. bus, whether the machines were tripped off the line due to overload or due to underload, the actuation of the starting mechanisms, and the times at which the changes occurred

at high voltage and convert it to direct current in substations located at suitable points near the load. Previous to the development of automatic control the rotating machinery in these substations was operated manually. Elaborate records were made of the loads and other details of operation in order to make the best use of the equipment available.

With the change to automatic control it was only natural to attempt to obtain similar information of the automatic control by the use of graphic meters, remotely controlled indicators located in the load dispatcher's office, operation counters or other recording devices on some of the more important relays, and other similar arrangements. The Pacific Electric Railway Company has ten automatic substations in operation and five more under construction and scheduled to be completed during 1925. These substations are scattered over a large territory. Some of them are nearly twenty miles, in different directions, from the load dispatcher's office. Private telephone lines connect all substations, but these lines already are loaded to the limit of satisfactory operation and could not be used for a remotely controlled indicator system. Several of the substations, however, have indicators controlled over the telephone lines to the nearest manual substation to notify the attendant whether the automatic is "on" or "off". Special graphic meters, one in each substation, are used to record the d.c. load, the trolley feeder voltage and the operation of four of the automatic-control relays.

Several standard type graphic meters might have been used, each to record a given function. However, it is very desirable to have all records on one chart for convenience of inspection and for filing for future reference. The use of one chart has the further advantage of removing doubt as to the sequence of events, which might be uncertain or difficult to determine if recorded on separate charts.

Referring to the wiring diagram shown in Fig. 2 it may be seen that No. 1 pen is controlled by relays Nos. 4 and 12. No. 4 deflects the pen to the left and No. 12 to the right. If the control functions normally during the starting cycle, No. 1 pen is deflected to the left for a short time (approximately 50 seconds) and a few seconds after it is released from the left it is deflected to the right where it remains until the machine is shut down. Any other record by No. 1 pen indicates abnormal starting conditions or unreliable operation of some part of the control.

Pen No. 2 is deflected to the left by the opening of the overload contactor and to the right when the time-delay, underload relay is energized.

Overload protection is obtained by inserting resistance in the trolley-feeder or main-bus circuit, and if used when not needed an unnecessary energy loss is sustained. A record of the use of this resistance is kept by No. 2 pen. Idling of the machine on light load is indicated by the d.c. ampere record and any abnormal operation of the shut-down relays also is shown by No. 2 pen.

Outlining in detail the operation of the different recording pens, the following may be of interest (see Fig. 4):

Coil No. 6 is energized when the overload grids are cut into service by relay "GM15". An auxiliary contact on the contactor energizes the pen coil. This records overloads even though the machine may not be tripped off.

Coil No. 5 is energized when the underload relay "GM 13" shuts the machines down.

Coil No. 4, voltmeter coil, is cut in series with the reverse polarity relay "32". This saves the use of extra resistance for 1,200-volt service, but records the failure of the relay magnetizing coil.

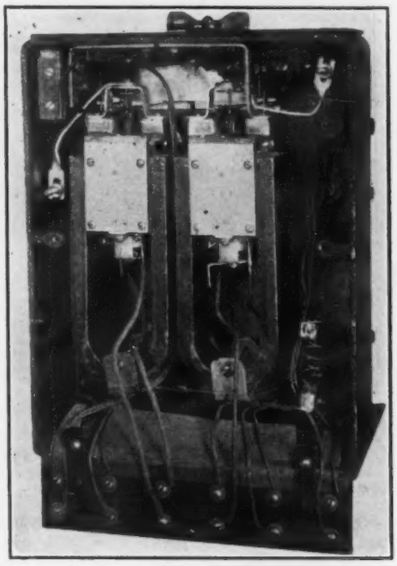


Fig. 3—Rear view of graphic recording meter showing the operating mechanisms. The two large elements are the ammeter and the voltmeter elements. Above each of these elements is another little mechanism, one controlling the starting-record pen and the other controlling the stopping-record pen

Coil No. 3 is connected in the indicating ammeter lead to avoid the use of an extra shunt.

Coil No. 2 is energized through an auxiliary contact on running contactor "37", the main-line d.c. circuit breaker.

Coil No. 1 is energized through an auxiliary contact on starting contactor "6".

The straight-line record appearing at either side of the chart on the meter shown in Fig. 1 shows normal continuous operation of the machines. The left-hand record line would be about ¼ in. farther to the left if the machines

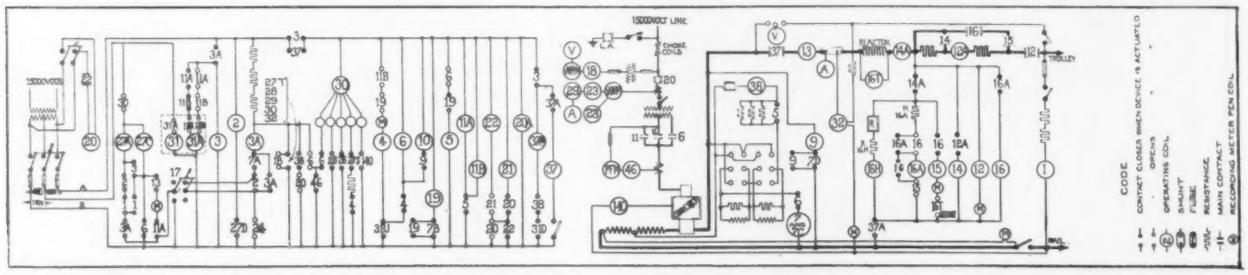


Fig. 2.—Schematic wiring diagram for automatic railway substation showing where recording meter coils are connected into control circuits.

were off the line, and about ½ in. farther to the left than shown during the starting periods. The straight-line record at the right of the same chart would be about ¼ in. farther to the right during a period of overload and ¼ in. farther to the left than shown if the machines were tripped off the line due to underload.

Proper interpretation of these charts is not difficult for anyone familiar with the operation of the automatic control and with the records made by the meter.

Several more pens could be used to record the operation of other parts of the control, but the mounting of two

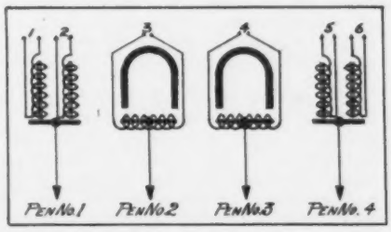


Fig. 4—Schematic sketch showing the different operating mechanisms of the four pens in the recording meter

standard graphic-meter elements and two additional pens, each controlled by two electromagnets, in one standard case is a radical departure from standard instrument design and any additional pens could be had only at considerable increase in the cost of the meters.

These charts give all of the essential information required for adjusting the operation of equipment and are a suitable substitute for the records taken by the attendants in manually controlled substations.

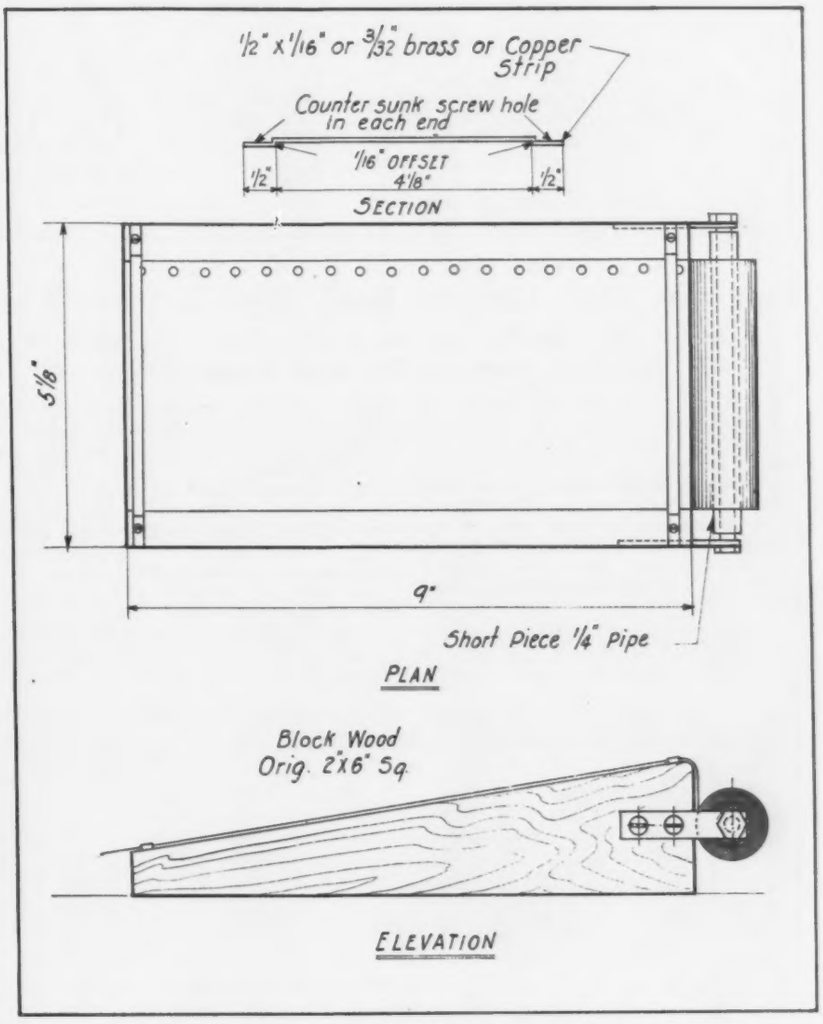
Scratch Pad Made of Wood Block and Meter Record Roll

A handy block for converting old graphic-meter record rolls into a readily accessible scratch pad is shown in the accompanying illustration. This is a simple device, easily made, and one which is well worth the small effort necessary for its construction. Any scrap piece of 2x6-in. planking will lend itself admirably to the job. A piece of fairly hard, close-grained wood is preferable, however.

As illustrated, the block is tapered from a thickness of about 2 in. to about ¾ in. to provide a sloping writing surface. The two strips which serve as paper guides are shaped most easily from a scrap piece of control-board bus bar about 3/16 in. thick and perhaps ½ in. wide. The supports for the roller can be fashioned easily from most any piece of waste copper that may be available. A ¼-in. bolt upon which to thread the record roll will complete the equipment, unless it should be desired to add a piece of small pipe or metal tubing over the bolt to make the roll ride more easily. If the block be carefully finished and the copper kept polished the pad will prove to be ornamental as well as useful.

Scratch paper is generally scarce around a power house or substation. At the same time in most plants there is at least one recording meter using a roll record, and many times there are several of these instruments in service. In most cases these rolls are not used for permanent record purposes. Sometimes they are run through the meter two or more times as an effort toward economy.

However, to use these rolls for scratch paper after their usefulness for record purposes is over, is as effective a measure of economy along this line as any.



Handy scratch pad for the station desk utilizes old meter record roll

Electricity Ventilates Stampede Tunnel in Cascades

An unique application of electricity to railroad operations recently was made by the Puget Sound Power & Light Company, Seattle, when it installed electric service to drive the ventilating fans in the famous Stampede tunnel of the Northern Pacific company in the Cascade Mountains, replacing an antiquated steam drive. The tunnel is 9,800 ft. long, and nineteen trains pass through it daily so that the need for forced ventilation is apparent. Two large fans, each driven by a 500-hp. motor, are located at the western portal to blow the air eastward through the tunnel. The motors are controlled manually, and it is the practice to start the fans for west-bound trains when the train enters the eastern portal, and for east-bound trains when the train leaves the eastern portal. The fans are left running until the interior has been cleared of smoke and gases.

Service for the motors is supplied from 110,000-volt transmission line of the Puget Sound company running from Seattle to Wenatchee, which passes near the Northern Pacific right-of-way at this point. A 1,500-kw. substation was installed to carry the service.

N.E.L.A. Issues Two Serial Reports.—"Radio Interference," serial report of the inductive co-ordination committee (1924-1925), and "A.C. Substation Design Practice," serial report of the electrical apparatus committee (1924-1925), Technical National Section, have been published by the National Electric Light Association. Copies may be obtained upon application to the association at 29 West 39th Street, New York City.

Power Switchboard and Switching Equipment Handbook Published.—The Electric Power Club of Cleveland recently has issued a "Power Switchboard and Switching Equipment Handbook." The book is divided into four parts: instructions for installation, operation and care; definitions, abbreviations and symbols; adopted standards and practices; and safety standards.

IDEAS FOR THE CONTRACTOR

Pan Gas Has Largest Roof Sign in the West

Immense Sign Erected in Los Angeles for Pan American Petroleum Company Has Many Unique Features

Five thousand two hundred and seventy-seven lamps to illuminate twelve letters is the record set by the "Pan Gas" sign on the roof of the Pan American Petroleum Building at Tenth and Flower Streets in Los Angeles. This is the largest roof sign in Los Angeles, the structure being 50 ft. high and 168 ft. long. Each letter is 28 ft. in height and the signs reads, "PAN GAS" double faced.

It was necessary to build a heavy steel structure to support this immense sign. Some idea of its size may be obtained when one considers the sign structure is one-third of the height of the building, which is 150 ft. high, the building height limit in Los Angeles. This structure may be seen in the accompanying pictures taken on the roof of the Pan American Petroleum Building. The letters are probably the largest erected anywhere in America, and the sign may be read from very great distances.

The illumination of the sign is unique. The letters are of channel type illuminated by five rows of lamps. The center row is red, the rows on either side are white and the outside rows green. The sign flashes first red, then green, then white, then all colors together. The illumination is with 10-watt sign lamps, the colors being secured by the use of Reco color hoods.

The design of the sign carries out the ideas of E. L. Doheny, chairman of the board of directors of the Pan American Petroleum Company, and is the largest electrical advertisement of any petroleum company in the United States. The work was executed by the Electrical Products Corporation of Los Angeles, who are specialists in manufacturing all types of electric signs and accessories. This installation is one of the largest ever made by the firm.

WHAT is probably the largest roof sign erected in the West recently was completed for Pan Gas in Los Angeles. The comparative size of the man with the sign in the accompanying pictures gives some idea of its immensity. The heavy supporting structure is also visible.

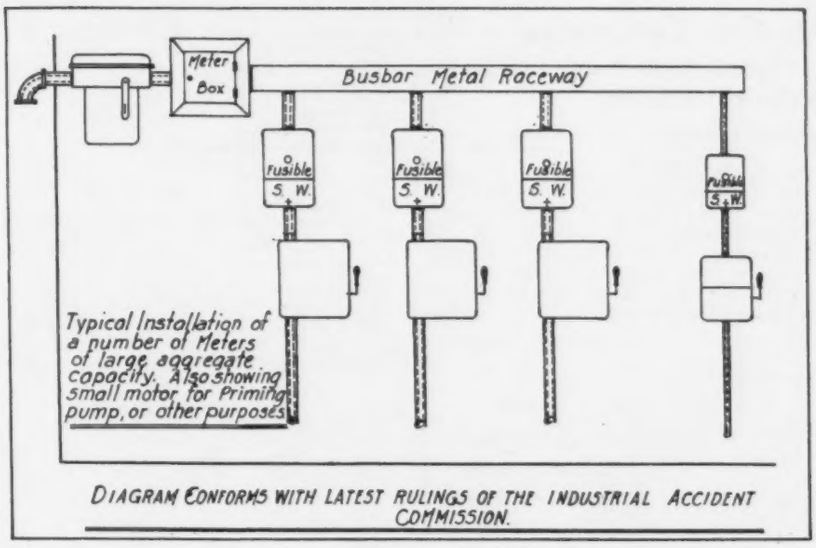

Meter Box
Busbar Metal Raceway
fusible S. W.
fusible S. W.
fusible S. W.
fusible S. W.
Typical Installation of a number of Meters of large aggregate capacity. Also showing small motor for Priming pump, or other purposes
DIAGRAM CONFORMS WITH LATEST RULINGS OF THE INDUSTRIAL ACCIDENT COMMISSION.

Fig. 4

Safety-First Installations for the Electrical Contractor

The Aug. 15 issue of the Journal of Electricity (p. 140) contained a discussion of a typical installation of two or more motors of moderate aggregate capacities. This was the third of a series of five which will show five different types of installations commonly made by electrical contractors.

Fig. 4 is a typical installation of a number of motors where the capacity may vary, showing large and small, but all within sight of an operator. It will be noticed that the service is brought directly to a circuit breaker just ahead of the meter box and then to a bus bar metal raceway where each circuit is led off to the disconnecting switches which are directly ahead of the starting equipment.

About the only differences between Fig. 3 and Fig. 4 are the circuit breaker and the metal raceway. The reason that a circuit breaker is shown here is that in many installations the circuit breaker is made necessary on account of the large capacity required by so many motors on the same service.

The bus bar metal raceway as shown in Fig. 4 is very simple, inexpensive, and as safe a method of bringing out a bus for the circuit as can be devised. This metal raceway is usually 6 or 8 in. wide, 6 in. deep, and the length of the wall mounting that is desired. On the front is a cover that is installed by screws which enter the lip of the can and in this way covers up all of the unsightly wiring and connections that are made within.

It must be remembered also that if these circuits are led to motors where the switching apparatus installed is not in sight of the operator the non-fusible disconnecting switch must be installed.

Selling to the Meanest Man

A resourceful young salesman tried to sell an electrical washing machine to the meanest man in the world. His sales argument was that it would save the housewife.

"My wife's able-bodied and can stand lots of work," the sales prospect retorted. "That's why I married her—because she is a good worker."

"Then for goodness' sake," suggested the smart salesman, "why don't you give her the tools to make it possible for her to accomplish still more work for you?"—Nation's Business.

Electrical Community Kitchen a Feature of Modern Auto Camp

The Paso Robles auto camp presents a striking contrast to the average camp of this kind, especially with reference to the facilities provided in the community kitchen. Instead of the usual dark and dismal appearance produced by sooty stoves, this kitchen is light and airy after a full season's campers have made use of it. The reason for this is the fact that electric hot plates are provided for the convenience of campers.

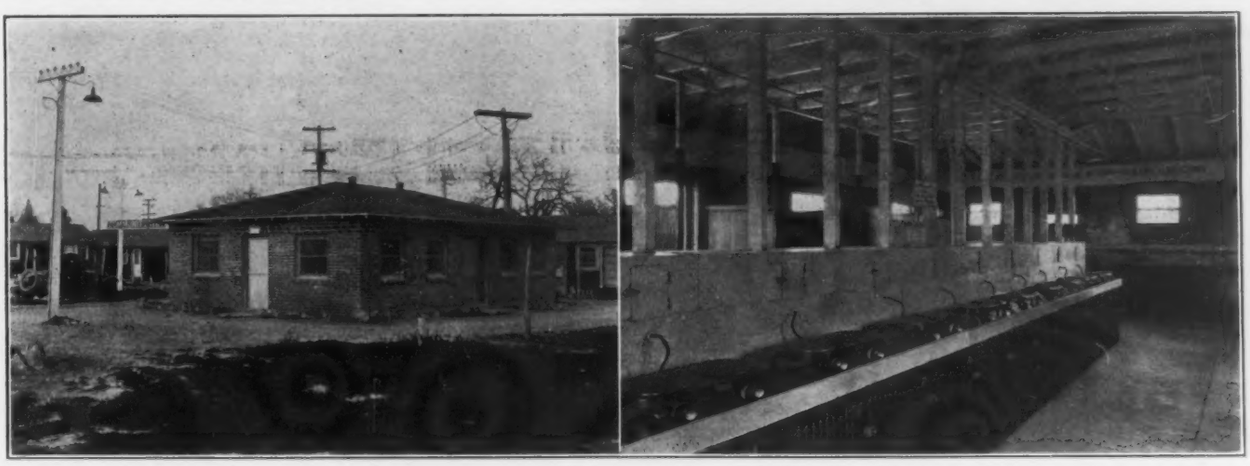
These are placed in two rows in the center of the community kitchen. There are twenty Universal units of two plates each. The disconnecting switch for each unit is concealed in a locked compartment above each one. The table is lined with galvanized iron, which adds to its cleanliness and appearance. Compartments for the storage of cooking utensils are provided below the cooking units. A Hot-Point electric water heater provides continuous hot water service for the convenience of the guests.

C. T. Azbell, owner of the camp, is well pleased with the success of the electric kitchen and contemplates erecting a duplicate of the original installation to accommodate the increased demand of motorists. J. B. Hurst of Atascadero was instrumental in selling Mr. Azbell the idea of complete electrification and made the installation for him. A similar installation is now being made in an auto camp at Atascadero.

Automobile camps are installed in all parts of the country and more are being built all the time. All of these are potential prospects for this type of equipment, and offer a splendid field of development by the progressive contractor.

Booths have been built around the walls in the kitchen for the convenience of guests in serving their meals. Tables are provided as well as built-in benches. Thus a family stopping at this auto camp is not only able to cook its meals in a clean and cool kitchen but also has the facilities for serving the meal without being annoyed by the dust and dirt produced by passing automobiles and other campers.

The use of the community kichen, together with the use of the electric hot plates, hot water, and other conveniences, is included in the nominal charge for stopping at the camp.



Left: Exterior of the electric community kitchen in Paso Robles auto camp of C. T. Azbell. Right: Interior view showing the electric hot plates which are provided for guests at the camp. The sink in the background is provided with hot and cold water, the water being heated electrically

Electrical Estimating for the Contractor — III

An Electrical Layout is Made for a Typical Small-Power Installation in This Article, the Third of a Series

By J. R. WILSON*, Engineering Department, Los Angeles Electric Works

To apply the rules contained in the previous installment of this article, let us take a typical small-power installation and make an electrical layout for it.

Referring to Fig. 1, which shows the location of machinery and motors, we observe several important items which bear on the electrical wiring scheme.

along the "alley" wall, because it will not interfere with future building operations. Upon inspection we find that the largest motors (15 and 20) are close together. Upon consulting the owner we find that the wall space between these motors can be spared for the metering equipment.

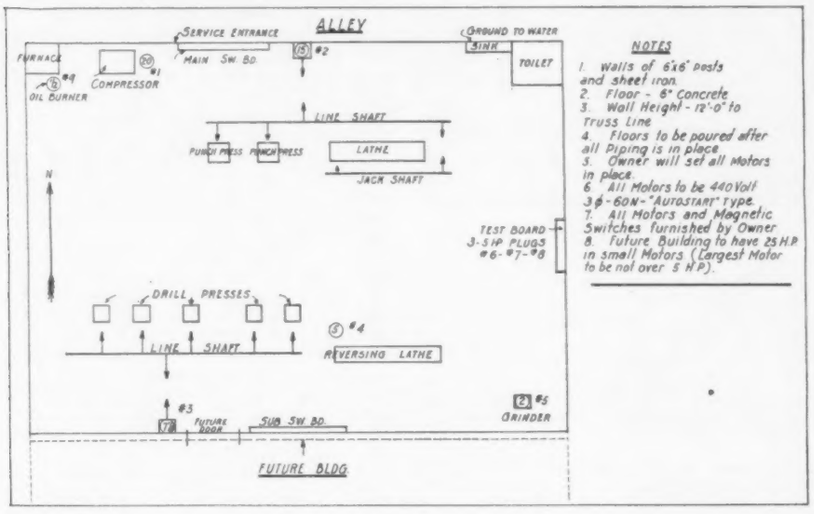


Fig. 1.

We summarize these items as follows:

1. Building sets on alley line.
2. Water (at sink) is on alley side of building.
3. Largest motors are on alley side of building.
4. Floor is to be of concrete.
5. All motors are of "auto start" type.
6. All motors are 440-volt, 3-phase, 60-cycle.
7. Future building to have 25 hp. in small motors.
8. Furnace to be fed by "oil burner" set.

With this data to work with we can proceed to analyze the job. Items 1, 2 and 3 show that the logical place to locate the service entrance and meter is

Upon further inspection we find that the balance of the motors are located adjacent to the south wall, also the future 25-hp. is on that side. We decide that it will make the best installation if we locate a sub-switchboard on this wall, and the owner assigns a location for it.

Checking the motors shown on the plan and consulting table No. 1, we get the following data from which to figure our feeder loads:

Compressor	20 hp.=	65-amp. starting current
Line shaft	15 hp.=	19-amp. running current
Lathe	5 hp.=	7-amp. " "
Test plug No. 1	5 hp.=	7-amp. " "
Test plug No. 2	5 hp.=	7-amp. " "
Test plug No. 3	5 hp.=	7-amp. " "
Grinder	2 hp.=	3-amp. " "
Line shaft	7½ hp.=	10-amp. " "
Oil burner	½ hp.=	1-amp. " "
Future (1¼ amp. per hp.)	25 hp.=	32-amp. " "
Extra	33 hp.=	42-amp. " "
Total		200 amp. service switch

By consulting column B of table No. 2 we see that No. 1 wire has a capacity of 150-amp. while 1/0 has capacity of 200-amp., so we take the 1/0 wire as the size for our service wire. This automatically gives the owner an added capacity of 33 hp. at no additional cost.

Upon further inspection of the plan, we find that all the motors (except the 15-hp., the 20-hp. and the ½-hp.), will go to the sub-switchboard. We also see that the largest individual motor in this group is the 7½-hp.

So now we will check on Table No. 1 to determine the size of our sub-feeder:

Line shaft	7½ hp.=	30-amp. starting current
Lathe	5 hp.=	7-amp. running current
Test plug No. 1	5 hp.=	7-amp. " "
Test plug No. 2	5 hp.=	7-amp. " "
Test plug No. 3	5 hp.=	7-amp. " "
Grinder	2 hp.=	3-amp. " "
Future	25 hp.=	32-amp. " "
Add to fill switch capacity	5 hp.=	7-amp. " "
Total		100-amp. sub-feeder switch

Column B, table No. 2, gives us No. 2 wire as being correct for this feeder.

Our service conduit will be run exposed, using one elbow to carry to the outside of alley wall. As the concrete floor will be poured after all other work is completed, we will take advantage of this fact and run all conduits in the floor as far as practicable. On this basis we will use two elbows on our sub-feeder conduit.

TABLE NO. 1

3-Phase—440-Volt Squirrel Cage Induction Motors

Rated hp.	Approx. full load current	To running overload protection rubber or varnished cloth insulation wire	From running overload protection to motor: Rubber insulation wire	Varnish cloth insulation wire	Circuit overload protection	Motor running overload protection
¼	.5	14	.....	.....	5	.....
½	1.0	14	.....	.....	5	.....
¾	1.3	14	.....	.....	8	.....
1	1.6	14	.....	.....	10	.....
1½	2.3	14	.....	.....	12	.....
2	3.0	14	.....	.....	15	.....
3	4.6	14	14	.....	20	6
5	7.	14	14	.....	25	10
7½	10	12	14	.....	30	12
10	13	10	12	.....	35	20
15	19	8	10	.....	50	25
20	26	6	8	.....	65	35
25	32	6	6	.....	75	40
30	38	6	6	6	90	50
35	44	4	4	6	100	55
40	51	4	4	4	120	65
50	62	3	3	4	130	80
60	73	1	2	3	150	90
75	91	0	0	2	200	110
100	123	000	00	0	250	150
125	156	0000	0000	000	325	200
150	184	250 M	0000	0000	375	225
200	246	350	350 M	250 M	500	300
250	310	500	500	400	600	400

NOTE—Wire sizes and conduits given do not apply for motors for elevators and cranes.

TABLE NO. 2

Safe Carrying Capacity of Copper Wires

Size B&S	Circ. Mils.	AMPERES "A" Rubber	"B" Other Ins.	"C" Var. Cloth	"D" 15 Min.
18	1624	3	5	.....	.....
16	2583	6	10	.....	.....
14	4107	15	20	18	22
12	6530	20	25	25	26
10	10380	25	30	30	33
8	16510	35	50	40	50
6	26250	50	70	60	73
4	41740	70	90	85	97
2	66370	90	125	110	130
1	83690	100	150	120	154
0	105500	125	200	150	182
00	133100	150	225	180	220
000	167800	175	275	210	270
0000	211600	225	325	270	325
	250000	250	350	300	375
	300000	275	400	330	435
	350000	300	450	360	500
	400000	325	500	390	555
	500000	400	600	480	660
	600000	450	680	540	750
	700000	500	760	600	830
	800000	550	840	660	905
	900000	600	920	720	975
	1000000	650	1000	780	1040
	1100000	690	1080	830	.....
	1200000	730	1150	880	.....
	1300000	770	1220	920	.....
	1400000	810	1290	970	.....
	1500000	850	1360	1020	.....
	1600000	890	1430	1070	.....
	1700000	930	1490	1120	.....
	1800000	979	1550	1160	.....
	1900000	1010	1610	1210	.....
	2000000	1050	1670	1260	.....

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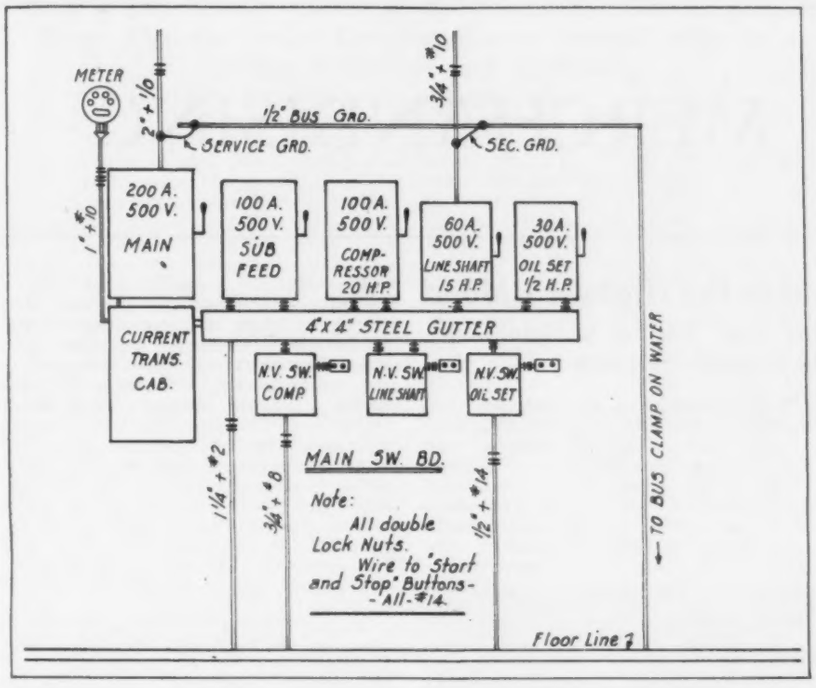

METER
2" + #0
1/2" BUS GRD.
SERVICE GRD.
3/4" + #10
SEC. GRD.
1" + #10
200 A. 500 V. MAIN
100 A. 500 V. SUB FEED
100 A. 500 V. COMPRESSOR 20 H.P.
60 A. 500 V. LINE SHAFT 15 H.P.
30 A. 500 V. OIL SET 1/2 H.P.
4" x 4" STEEL GUTTER
CURRENT TRANS. CAB.
N.V. SW. COMP.
N.V. SW. LINE SHAFT
N.V. SW. OIL SET
MAIN SW. BD.
1/4" + #2
3/4" + #8
1/2" + #14
Note:
All double Lock Nuts.
Wire to "Start and Stop" Buttons - All - #14.
TO BUS CLAMP ON WATER
Floor Line

Fig. 2.

By checking on table No. 3 we see that our service conduit will be of 2-in. size, and our sub-feeder conduit will be of 1¼-in. size. In this job layout no attention will be paid to distances, or "drop" as at this time we are interested only in analyzing the job. In the ordinary small job, such as this, the wire sizes listed in the accompanying tables usually will be ample to take care of the drop, especially on 220 and 440-volt installations.

We will locate all the magnetic switches, except those for the test plugs, on the switchboards. Referring again to Fig. No. 1, and also to table No. 1, we get the following data for the individual motor wiring:

20 hp.—3 No. 6 wires to N. V. switch and 3 No. 8 to motor.
15 hp.—3 No. 8 wires to N. V. switch and 3 No. 10 to motor.
7½ hp.—3 No. 12 wires to N. V. switch and 3 No. 14 to motor.
5 hp.—3 No. 14 wires to N. V. switch and 3 No. 14 to motor.
2 hp.—3 No. 14 wires to motor.
½ hp.—3 No. 14 wires to N. V. switch and 3 No. 14 to motor.

You will note that a magnetic switch is specified on the ½-hp. motor, and not on the 2-hp. motor. This is explained by the fact that the ½-hp. motor is located on an "oil burner" set. If the voltage fails (and the fire is extinguished) and then suddenly returns to the line, the set would automatically feed oil against the hot boiler, and might cause a disastrous explosion. On the other hand the 2-hp. motor is on a grinder, which is not considered a "dangerous machine", and ordinarily would cause no damage by being suddenly thrown on the line.

Referring to Fig. No. 2, we have the set-up of the main switchboard.

(To be continued.)

TABLE NO. 3
Number of Wires
In Conduit with 290 deg. Full Radius Ells
(Based on 40% space factor)

B & S	½	¾	1	1¼	1½	2	2½	3	3½	4
14	4	6	9	....	....	....	....	....	....	....
12	4	5	9	....	....	....	....	....	....	....
10	2	4	7	9	....	....	....	....	....	....
8	....	3	5	9	....	....	....	....	....	....
6	....	....	3	4	6	9	....	....	....	....
4	....	....	....	3	4	8	9	....	....	....
2	....	....	....	3	4	6	9	....	....	....
1	....	....	....	2	3	5	7	9	....	....
0	....	....	....	....	2	4	6	9	....	....
00	....	....	....	....	....	3	5	8	9	....
000	....	....	....	....	....	3	4	7	9	....
0000	....	....	....	....	....	2	3	6	8	9

Survey Points Out Large Field in Store Window Lighting

A recent survey throughout the country shows that out of the 2,000,000 stores now doing business in the United States only one store in twenty has illumination that may be considered good, while only one store in thirty-five has window-illumination intensity of fifteen foot-candles.

An entirely independent survey recently was conducted in the field of economics to determine the number of merchants who start in business and succeed and the number who start and fail. This survey proved that out of every twenty men who inaugurate business enterprises nineteen fail and one succeeds.

These entirely different surveys found that ninety-five per cent of the business places in the country are poorly lighted, also that ninety-five per cent of the business enterprises launched in the country fail. It is interesting to note that the percentage of failures is identical with the percentage of defective lighting installations.

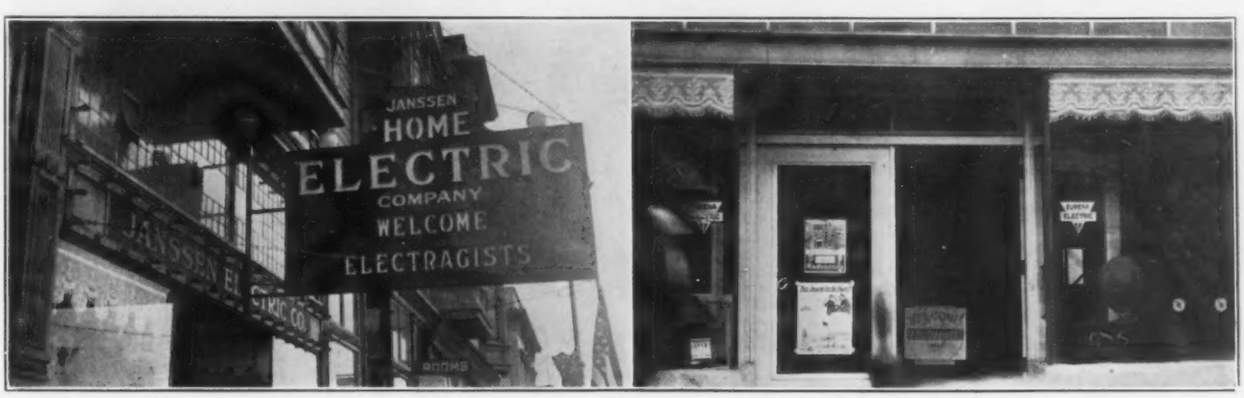
It is not intended to infer that a properly lighted store is a sure means of success, but better lighting is an aid to a successful business, and contractors can prove this fact.

"Welcome Electragists" Sign Prominent at Eureka

The electragists of Eureka were very active in doing everything possible to make visiting delegates feel welcome during their stay in that city while attending the recent convention of California Electragists. All stores of electragists displayed in a conspicuous place a painted sign, "Welcome Electragists," some dealers putting these signs in their windows and others on stands at the entrance of the stores.

One electragist also had "Welcome Electragists" printed into his electric sign. These signs and cards of welcome made a very favorable impression on the delegates to the convention and also did a great deal of good in getting the word "electragist" before the people of Eureka.

The newspapers cooperated with the convention exceptionally well and gave a great deal of space in their news columns to its proceedings. They, too, made frequent reference to electragists in all stories. Publicity of this kind will do much to educate the public to the true meaning of the word "electragist."



Left: The electric sign of the Janssen Electric Company during the convention of California Electragists recently held in Eureka. Right—front of the Eureka Electric Company showing in a prominent place the sign of welcome to electragists. These signs were used by all electragists

BETTER MERCHANDISING

Are You All Through? Sold to the Highest Bidder!

Southern Colorado Power Company Uses Auction to Gain List of Prospects in Electric Washer Campaign

Sealed bids for the purchase of an electric washing machine constituted one of the unique features of a sales campaign recently conducted by the Southern Colorado Power Company. Judging from the interest displayed in the auction of the washer, the idea was considered by the company as entirely satisfactory. The campaign lasted one month and during that time 408 electric washing machines were sold.

The plan as outlined and put into effect by the Colorado company consisted in the announcing of the auction of an electric washer, the washer to go to the person making the highest bid. Newspaper announcements as well as window displays called the public's attention to the auction. All bids were to be made on cards specially prepared for the auction and distributed from the company's districts offices. Bids were to be received on one day only, the auction being held after the sales campaign had been under way about two weeks.

The campaign was conducted simultaneously throughout the entire territory served by the company. Offices are maintained in Pueblo, Canon City, Cripple Creek, Victor, La Junta, Rocky Ford and Ordway. The auction was held on the same day in each of the districts. The highest bids for the washers ranged from $95 to $123.75. The sale price of the machines was $125.

As each bid that was submitted was signed by the bidder, the names of the unsuccessful bidders made an excellent list for salesmen to visit. A suitable list was prepared from the bids and was given to the salesmen in each district. Armed with this list of prospects the salesmen made a house-to-house canvass of the seven cities, and each salesman exceeded his quota set before the campaign was opened.

Plans for the washing-machine campaign were made by the utility company working with representatives of the Automatic Washing Machine Company. Twelve salesmen were employed to conduct the personal solicitation provided for in the plans. In addition to this the regular employees of the company were given a bonus for turning in prospects and for making direct sales. Quotas were prepared for each branch office and for each salesman. The total quota for the entire property was 200 machines. Due to the well laid plans and advertising used, the salesmen were able to place a total of 408 new washers in the homes of people taking service from the central station. Each branch sales office sold double its quota, no particular office overselling the others.

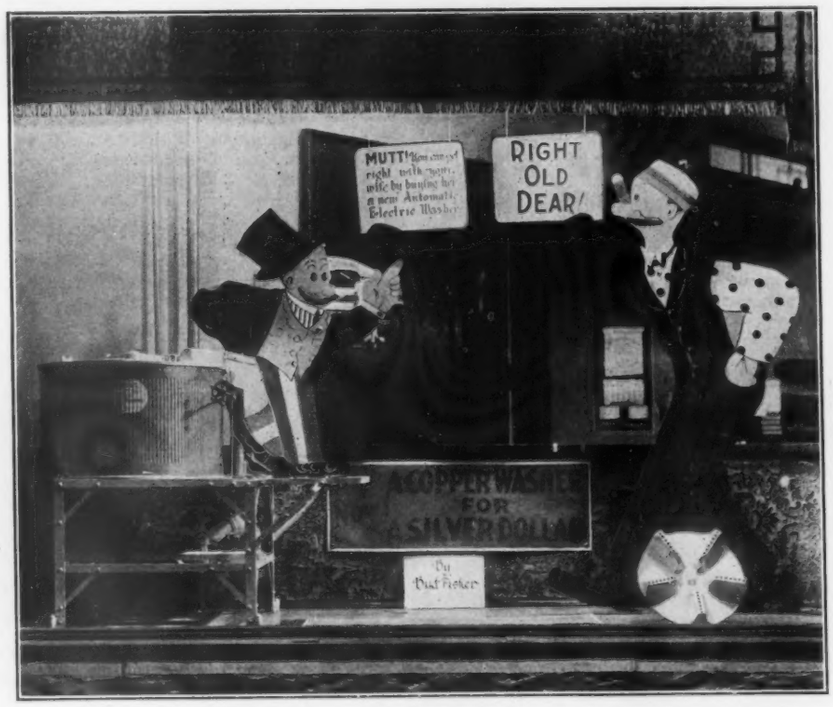
The success of the campaign is verified by the fact that in seven cities with a population of 61,599 sales of new washing machines totaled 408 within a period of one month. These cities are located in five Colorado counties, which in January, 1923, had a total of 15,930 residential lighting customers. The total retail value of the merchandise sold during the campaign was $51,000 or an average of approximately $3.20 per residential lighting customer.

Previous to the opening of the campaign all of the outside salesmen and the local salesmen were called into the general offices of the company in Pueblo and were given the details of the sales campaign that had been planned. In this way each salesman was acquainted with the entire sales plan as outlined by the executives of the company. At this meeting it was decided to start the campaign with a gift day, the purpose of this scheme being to draw possible prospects into the company's district offices on the first day of the sales drive. Each lady that came into one of the company's offices was given a rubber apron. As the apron was passed out the lady's name was taken and was added to the list of prospects.

Plans for the campaign also included the giving of rubber aprons and electric percolators as special premiums. The company conducted a similar campaign last year, and it was decided to use approximately the same slogan—"Now a Copper Washer for a Silver Dollar"—as this had been well received by the public. The slogan was used in all of the advertising, and skull caps, which were passed out to the children, were decorated with the device. The slogan was originally adopted on account of the down payment of $1 that was accepted. The balance of the purchase price was to be paid in monthly installments of $5 each.

In a similar campaign conducted a year ago the Southern Colorado Power Company sold in the neighborhood of two hundred machines. The quota for this year's drive was based on the sales recorded in the previous campaign. Though the sales were doubled in the last campaign the relation of the number sold in each district remained nearly constant.

Fred E. Staible, Inc., recently organized by Fred E. Staible, Jr., formerly head of the Wesco Supply Company, Denver, will represent the following manufacturers: United States Rubber Company, Illinois Electric Porcelain Company, Enamelled Metals Company, Triangle Conduit Company, and Steel City Electric Company.



One of the window displays used to attract attention to the washing-machine campaign conducted by the Southern Colorado Power Company in all of its districts.

Campaign Sells 2,000 Electric Fireless Cookers

Valley Electrical Supply Company Proves Demand Exists for Practical Moderate-Priced Appliance

By J. U. BERRY

Advertising Manager, Valley Electrical Supply Company, Fresno, Calif.

On the theory that there was a demand for a portable, practical, easily cleaned, moderate-priced electric fireless cooker, the Valley Electrical Supply Company of Fresno, Calif., recently staged a selling campaign featuring this appliance. Results more than justified the theory, for over 300 cookers were sold on the first day of the campaign, by the end of the first week orders had been taken for more than 700, and at the close of the sale 2,000 electric fireless cookers had been sold.

It was decided that the opportune time to start a cooker campaign in the San Joaquin Valley was just after the close of school at a time when vacaton trips were being planned, because such a cooker would have a strong appeal to those who were going to the seashore or mountain resort where electricity was available. Also, the warm weather starts about the middle of June, which presented another strong selling argument in favor of the electric cooker.

After deciding on the time and selecting the cooker to be featured, the next big problem was how to get the story over to the housewife. The message must be told completely and clearly in the advertising, because the cooker had no proven worth to the housewife. It was something new to her and brought to her at a price that might make her sceptical of its quality and value, therefore she must take it on the recommendation of the seller.

A four-column advertisement was prepared and carefully revised several times. This advertisement appeared in both Sunday newspapers on June 14, and the sale started on Monday, June 15. Three days prior to the start of the sale the following letter was mailed to 700 customers who had purchased electric percolators in a recent percolator campaign:

Dear Madam:

When you purchased that Electric Percolator during our recent Annual Percolator Sale, you proved to us that you know a good value and that you are seeking "Things Electrical" because they are practical and will lighten your household duties.

AND NOW!

We just want to tell you about another wonderful value—It's an ELECTRIC-FIRELESS COOKER that will cook any kind of food, any way you want it cooked. No housewife who gives proper consideration to her time and energy will be without it. It is a real time and labor saver that will cook foods more tastily and delicious. Just the sort of HIGH QUALITY Electrical Device that will appeal to you. And think of it! The price is only $7.95 On Terms of $1.95 Down and the balance in three equal payments of $2.00 each.

This Sale Starts Monday, June 15th, but you will be allowed the privilege of purchasing your Cooker on Saturday, June 13th if you present this letter—thus, we will have more time to demonstrate the Cooker to you.

Read the enclosed circular and it will tell you what the COOKER will do. We know you will want to tell all your friends about it. You'll be enthusiastic, too. It's' the best Cooker Value obtainable.

As a result of these letters 105 cookers were sold on Saturday. A broadside, which was an exact duplicate of the initial advertisement, was run off on good quality book paper and delivered to every home in the city two days before the sale. The response from this and the newspaper advertising was far beyond expectations. Over 300 cookers were sold on Monday, the first day. The company's original order called for 500 cookers, but by the end of the first week orders had been taken for more than 700 cookers without any further advertising.

On Sunday, June 21, another advertisement was run in both papers stating that 500 more cookers had been ordered and that delivery would be made before the middle of July. In this advertisement an apology was made regarding inability to deliver cookers as ordered. The response was phenomenal, and at the close of the sale 2,000 cookers had been sold.

Electric cooker window of Valley Electric Supply Company in San Joaquin Bldg. during campaign.

One of the most important selling factors in this electric cooker campaign was a demonstration booth just inside the main entrance of the building. On display here were cakes, pies, meat roasts, vegetables, baked beans, rice, baked apples and stewed prunes, all of which had been cooked in the cooker. One cooker was kept in operation during the entire first week, sending out delicious odors of roast meat and vegetables. Ice cream and ices which had been frozen in the cooker were also on display.

During the first days of the sale as many as twenty-five to thirty women were gathered around the demonstration booth at one time, all eager to learn about the cooker. Most of these women knew the advantages of the fireless cooker, but were not familiar with the added conveniences of the electric fireless cooker. This cooker campaign, coming as it did just at the start of the hot weather, presented a wonderful opportunity for the housewife to spend more of her time out of the hot kitchen and still have more appetizing meals to set before the family. The portable feature of this cooker also had a strong appeal; the fact that the meal could be started in the cooker and the cooker placed in the automobile and taken to the hills where the picnic lunch could be served piping hot and deliciously cooked made the appeal doubly attractive.

The company's obligation to the hundreds who have purchased these cookers does not end when the cooker is delivered into the home; it must see that the customers are satisfied with what the cooker will do. It is the company's duty to its customers, to itself and to the power company to see that the cooker is kept in use. Therefore, a special set of recipes, all of which will be tried and proved, is being prepared. These will be sent to each purchaser of a cooker and will be accompanied by a letter which will convince the customers that the company still is interested in them and are ready at all times to be of service. The success of future campaigns depends upon keeping the purchasers satisfied with the article and convincing them that it is to their advantage to continue its use.

DO YOU KNOW?

That 21,000,000 letters went to the Dead Letter Office last year?

That 803,000 parcels did likewise?

That 100,000 letters go into the mail yearly in perfectly blank envelopes?

That $55,000 in cash is removed annually from misdirected envelopes?

That $12,000 in postage stamps is found in similar fashion?

That Uncle Sam collects $92,000 a year in postage for the return of mail sent to the Dead Letter Office?

That it costs Uncle Sam $1,740,000 yearly to look up addresses on misdirected mail?

That 200,000,000 letters are given this service, and—

That it costs in one city alone $500 daily?

That this vast sum could be saved and the Dead Letter Office abolished if each piece of mail carried a return address, and if each parcel were wrapped in stout paper and tied with strong cord?

Moral: Every man knows his own address if not that of his correspondent. Put it in the upper lefthand corner!

NEWS OF THE INDUSTRY

Hetch Hetchy Contract Opinion Refused by Secretary Work

Hubert Work, Secretary of the Interior, has declined to render an opinion upon the validity of the contract made between the city of San Francisco and the Pacific Gas and Electric Company for the distribution of power from the Moccasin plant of the Hetch Hetchy project. In a letter written to James Rolph, Jr., mayor of San Francisco, he stated:

> The act approved December 19, 1923 (38 Statute 242), does not require the Secretary of the Interior to approve or disapprove contracts such as the contract entered into between the City and County of San Francisco and the Pacific Gas and Electric Company, dated July 1, 1925.
>
> It is the duty of the City and County of San Francisco at all times to comply with and observe on its part all the conditions specified in this act, and it is the duty of the Secretary of the Interior, in the event that the conditions specified in the act are not reasonably complied with and carried out, to report the facts, after notifying the City and County of San Francisco in writing, to the Attorney-General for such suits or proceedings in the proper courts as the law and the facts in his opinion warrant. The Secretary should not act at this time, but must await such development of facts as will enable the Secretary to determine with a certainty whether or not this act is being reasonably carried out by the City and County of San Francisco.
>
> The violation of the law, if any, is a fact evidenced by acts, and the Secretary must necessarily await a reasonable time until performance shall have indicated whether or not the acts of the parties constitute such a violation of the law as will make action on his part proper.

The plant, which was shut down on account of damage to two of the penstock lines caused by an operating error on June 30 (Journal of Electricity, July 15, p. 66, and Aug. 1, p. 103), began delivering power from one unit to the Pacific Gas and Electric Company on Aug. 14. Announcement now is made that all four generating units are in operation.

Immediately following the announcement that power was being delivered by the city of San Francisco from the Moccasin plant to the power company the Modesto and Turlock Irrigation Districts petitioned the Secretary of the Interior to cancel the grant made to the city under the Raker Act on the grounds that such delivery constituted a violation of the act.

Industrial Lighting Campaign in Pacific Division Opened

The first gun of the N.E.L.A. industrial lighting committee's campaign in the Pacific Coast Division has been fired by A. M. Frost, sales manager, San Joaquin Light & Power Corporation, Fresno, Calif., who is geographic chairman of the division. This initial attack is in the form of two letters, one addressed to central station executives in the Pacific Coast Division, consisting of the states of California, Arizona and Nevada, and the other addressed to manufacturers of industrial lighting fixtures and their jobbers.

In the letter to central station executives, a copy of which is enclosed in the letter to the manufacturers and jobbers, Mr. Frost asks for cooperation in organizing the movement in the Pacific Coast Division and requests that each central station executive, manufacturer and jobber appoint someone in his organization to handle the activity, in cooperation with the chairman, in that organization. Mr. Frost further emphasizes the present poor status of industrial lighting and points out the opportunity that will be presented through national advertising and through contact with industrial executives, by means of central station salesmen, jobber salesmen, electrical leagues, and contractor-dealers, to develop an appreciation of the great value of proper industrial lighting, which can be capitalized immediately through the sale of better equipment, resulting in an immediate increase in kilowatt-hour sales.

Mr. Frost adds that he hopes to have an early meeting for the purpose of organization and discussion of general plans and that at this meeting appointment of leaders for the various sections of the Pacific Coast Division and of leaders for central special activities may be decided upon.

Baker River Plant Expected to Be Completed in October

The Baker River plant of the Puget Sound Power & Light Company, Seattle, Wash., is expected to be completed early in October, in spite of the numerous construction difficulties encountered on this project. Erection of the dam has been retarded at both ends, on the west by the necessity of keeping the railroad open and on the east by some additional excavation at high level. However, on Aug. 11 concrete in the central portion had been poured up to the spillway level, and form work to the highest point was in place. This dam, which is one of the highest, if not the highest, overpour type ever built, is 234 ft. from lip of spillway to stream bed below.

There are now on the project about 1,300 men at work. This, however, is about 300 below normal for this stage of the construction. The shortage is due to the demand for men to fight the forest fires in that section.

The transmission line has been completed, with the exception of two miles next to the power house.

Washington Utility Applies for License for Columbia River Project.—The Washington Water Power Company, of Spokane, Wash., has applied for a license for a project on the Columbia River at Hayes Island. It is proposed to build one dam above the upper falls and another at the lower end of Hayes Island. This will make available 150,000 continuous horsepower and 80,000 secondary horsepower, it is estimated.

Hydroelectric Project Planned at Prices Lake, Wash.

Permission to construct a reservoir at Prices Lake in Mason County, Wash., to store 25,000 acre-ft. of water for hydroelectric purposes is sought by the Lilliwaup Land & Resort Company of Lilliwaup, Mason County, according to an application which has been filed with R. K. Tiffany, state supervisor of hydraulics, by A. W. Layne of Lilliwaup, president of the company.

The project is to cost $200,000, according to the application, which states that construction is to begin on or before Jan. 1, 1927, and is to be completed by Jan. 1, 1929. Construction details have not been completed. However, the impounding dam is to be 100 ft. high, 700 ft. long on top and 200 ft. long on the bottom. The company proposes to take water at a 500-ft. head. The reservoir is to extend over 200 acres when submerged. It will have a maximum depth of 90 ft. and an average mean depth of 50 ft.

According to Mr. Layne, his company already has water rights near the mouth of Lilliwaup River.

Permission to appropriate 250 sec.ft. of water from the Lilliwaup River, near the point where the Lilliwaup Land & Resort Company proposes to erect its reservoir, is sought by the Lilliwaup Power and Water Company, 206 First Avenue, South, Seattle, according to an application which this company filed with the state supervisor Aug. 10. This company likewise proposes to erect a $200,000 power plant, should its application be granted. The plant would have a maximum capacity of 2,000 hp. at a fall of 150 ft.

No further Work to Be Done on Aberdeen Project Until Status Decided.—The city council of Aberdeen, Wash., has postponed until next year consideration of a proposition to make bedrock tests at the proposed dam site of the city water and power project on the Wynooche River. In order to make proper tests, S. C. Watkins, water superintendent, states it will be necessary to drill 1,500 ft. at an approximate cost of $11,000. City councilmen held the opinion that any additional improvements or work on the project should be delayed until the state hydraulic engineer hands down his report on whether the city will be allowed to go ahead with the development of the hydroelectric power plant there.

Oregon Utility Begins New Transmission Line.—The Pacific Power & Light Company, Portland, has begun construction work on a 66-kv. transmission line extending from Pomeroy, Wash., to Clarkston, Wash. Material has been delivered along the line, and pole holes have been dug for two or three miles out of Pomeroy.

Edison Company to Start Work on New 220-kv. Transmission Line

On Sept. 1 the advance guard of an army of 800 construction men will begin building the third 220-kv. transmission line between the Big Creek-San Joaquin power houses of the Southern California Edison Company and the city of Los Angeles, covering a distance of 231 miles at a cost of approximately $11,000,000. The electrical carrying capacity of the new line will be 200 000 hp.

This new transmission line will begin carrying power from the high Sierra to southern and central California by Jan. 1, 1927, when the enormous growth in the demand will require additional transmission. The industrial survey of the Edison-served territory commenced several years ago by R. H. Ballard, executive vice-president and general manager, shows that the time has arrived for preparing for the year 1927. July, 1925, showed an increase of over 148,000 hp. for lighting, industrial expansion and agriculture, as against July, 1924.

Of the $11,000,000 which this line and auxiliary buildings with equipment will cost, nearly $6,000,000 will be expended for land, labor, supplies and material purchased locally. The labor on the job will require the expenditure of approximately $3,000,000 for wages.

More than eighty miles of new road, in addition to the existing highways, will have to be built by the Southern California Edison Company to enable it to deliver the material to the tower sites along the line. These roads will be turned over to the public after they have served their purpose of carrying approximately 8,500 tons of material and supplies, and their construction and the large amount of blasting over the mountain regions will require the purchase of more than fifty tons of blasting powder which will also be manufactured in California.

Permanent and portable abodes numbering from 250 to 300 will be established for the working force. Practically all of the supplies for provisioning the workmen will be purchased from local merchants and producers. As an illustration of the enormous quantity of supplies necessary for a construction campaign of this character, the commissary department of the Southern California Edison Company has submitted to the executives the following approved estimate of the major items: 300,000 lb. of flour, 70,000 lb. butter, 80,000 doz. eggs, 45,000 lb. coffee, 38,000 lb. compound, 32,000 gal. canned fruit, 50,000 lb. dried fruit, 165,000 lb. fresh fruit, 750,000 lb. ice, 16,000 gal. evaporated milk, 270,000 lb. sugar, 26,000 gal. canned vegetables, 30,000 lb. dried vegetables, 143,000 lb. fresh vegetables, 400,000 lb. potatoes, 270,000 lb. fresh beef, 45,000 lb. fresh pork, 56,000 lb. veal, 60,000 lb. assorted meats, 45,000 lb. bacon, 60,000 lb. ham.

The transportation of a total tonnage of 8,500 tons of material, in addition to conveying the men to the camps and from camp to camp as the work progresses, will require large additions to the company's present automotive equipment. Construction tools and equipment, such as shovels, picks, axes and the like, will be purchased from local merchants as the work progresses. Road-building equipment is scheduled as a separate item and consists of tractors, road graders, road plows and similar equipment.

As the new line will traverse territory ranging from ten to thirty miles from the existing lines, an entirely new communication system will be built which will be 300 miles in length, requiring 9,000 poles, 1,200 miles (or 316,000 lb.) of copper wire, 10,000 cross-arms and 40,000 insulators.

Very important to the service of the community and its permanent development is the $3,244,000 item of estimates for additions to the substations at Eagle Rock on the north side of Los Angeles and Laguna Bell on the east side, these two stations being at the receiving ends of the two load centers of industrial southern California. In addition to this expenditure, there will also be an expenditure of three-quarters of a million dollars for switching stations, one located at Magunden in the San Joaquin Valley, half way between the generating stations and Los Angeles, and the other at Cresenta, the terminus of the new line.

While the work of constructing this new transmission line is in progress, activities in tunnel construction and power-house building are going on coincidentally on the Big Creek-San Joaquin River project of the company.

Power Project Planned on Cispus River in Washington

Application to appropriate 1,000 sec. ft. of water from Walupt Lake Creek, tributary of the Cispus River in Lewis County, Wash., and to construct a reservoir on Walupt Lake that will store 50,000 acre-ft. of water, both for hydroelectric purposes, has been made to R. K. Tiffany, state supervisor of hydraulics, by H. L. Gilbert, 313 Couch Building, Portland. The estimated cost of the project is not given, Gilbert stating in his application that no estimate of the cost is available and that construction details have not been completed. Construction dates have not been decided upon, he adds.

The impounding dam, which is to be of concrete construction, is to be 100 ft. in height and 1,800 ft. long on top. The area to be submerged by the reservoir when full will be 500 acres. The maximum depth of the reservoir is not known. The storage, according to the application, is contemplated for augmenting the water flow of the Cispus River for use in connection with a projected power plant on the Cispus River.

Technical Error in Advertising Bids for Diversion Dam of Cushman Project Second Unit.—Because of a technical error in advertising the bids, contractors' figures for the construction of the diversion dam in the second unit of the Cushman power project under development by the city of Tacoma, Wash., were not received by the city light department on the date set. According to a ruling of the city attorney, the council should have authorized the bids by resolution, and contractors were notified that this must be done before any figures can be considered. The work is estimated to cost $100,000.

Western Red Cedar Association Creates Research Division

At a special meeting of the Western Red Cedar Association recently held in Spokane, Wash., a research division was established with headquarters in Chicago. Kurt C. Barth was appointed director. The program outlined for the research division, according to the announcement of the association, contemplates complete service, alike, to the consumers and the producers, providing an agency whose sole duty is to advance their mutual interests.

Among the more important features are the co-ordination of producing conditions with consumers' needs, and vice versa; a collection of physical data, service records, and all technical information helpful to engineers and buyers responsible for the employment and purchase of western red cedar poles. Constant attention is to be given to all factors of production, distribution and treatment, so that the product of each member of the association may be maintained at the highest standard of quality and value. To this end every effort will be made to cooperate with all technical and other organizations interested in, or dealing with, conductor supports.

From time to time pertinent literature will be made available for general distribution; but in a large measure the service offered to pole consumers of necessity must be of a more personal nature, dealing particularly with specific problems. Those desiring information about western red cedar poles should address the Research Division, Western Red Cedar Association, 5 South Wabash Avenue, Chicago.

Sir Adam Beck of Ontario Hydro Commission Dies

Sir Adam Beck, chairman of the Ontario Hydro-Electric Commission since its organization nearly eighteen years ago, died at his home in London, Ont., Aug. 15. Sir Adam began his political career in 1902 when he was elected to the Provincial Legislature of Ontario. He immediately became interested in the development of electric power at Niagara Falls and a year later was appointed to a commission to investigate the possibilities of power development. Three years later he introduced a bill which created the Ontario Hydro-Electric Commission and upon the formation of this body was appointed its chairman. He has been an active advocate of municipal ownership throughout his entire career and has been largely responsible for the growth and development of the Ontario system.

Ellensburg, Wash., Orders Report on Municipal Plant.—The city of Ellensburg, Wash., has commissioned Barr & Cunningham, engineers, Portland, Ore., to prepare a report on the proposed improvement and enlargement of the city hydroelectric plant. An offer by the Puget Sound Power & Light Company to buy the municipal electric plant for $270,000 led the city to seek the present survey and report on its system to determine whether it would be advisable to sell or to enlarge the plant under municipal ownership. The present capacity of the plant is 1,500 kw. developed by three turbines. Additional turbines probably will have to be added to develop greater capacity.

New Officers Elected by Pacific States Electric Company

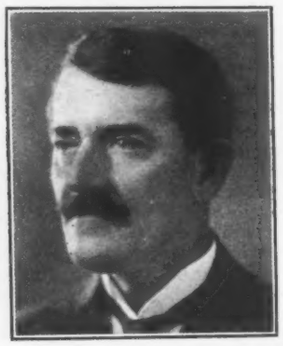
At a meeting of the board of directors of the Pacific States Electric Company in San Francisco on Aug. 18 D. E. Harris was named president to fill the position left vacant by Tracy E. Bibbins, who died last month.

Mr. Harris started his electrical career twenty-seven years ago as office boy for the company of which he is

D. E. HARRIS

now the head. He is one of the outstanding figures of the electrical industry in California, and has been connected intimately with the development and expansion of the use of electrical appliances. Mr. Harris was one of the organizers of the California Electrical Bureau and aided in sponsoring the first electrical homes displayed in California. He also has been active in the work of the Pacific Coast Electrical Supply Jobbers Association.

At the same time the company announced the election of H. R. Noack,



H. R. NOACK

vice-president of the company, to the board of directors. Mr. Noack entered the electrical industry in 1898 with John Martin, who represented the Stanley Electric Manufacturing Company and the Locke Insulator Company. Mr. Noack was active with Mr. Martin in effecting the consolidation of a number of early power companies which later became the basis of the Pacific Gas and Electric Company system.

The John Martin Company later became Pierson Roeding Company. Mr. Noack retained his interest in this company until 1917 when he joined the force of the Pacific States Electric Company. He is head of the high-tension transmission department of the Pacific States company and has been a vice-president since 1921.

Water Rights Applied for in Proposed Power Projects

Among the applications for permission to appropriate water that have been filed recently with the California Department of Public Works, Division of Water Rights, are several which are seeking water for use in the generation of electric energy.

J. N. Turner, in care of R. B. Swayne, 201 Sansome Street, San Francisco, has applied for the diversion of 37.5 sec.ft. and storage of 6,400 acre-ft. of water in Plumas County from Jamison, Downieville Fork, Deer and Bear Creeks tributary to the Middle Fork of the Feather River. This project is estimated to cost $100,000.

The Western States Gas & Electric Company, through Chickering & Gregory, Mechants Exchange Building, San Francisco, has applied for permission to store annually 7,500 acre-ft. from Silver Fork, tributary to the South Fork of the American River, for diversion in connection with its El Dorado power project in El Dorado County.

The Feather River Power Company, Hobart Building, San Francisco, has filed application for permit to store 80,000 acre-ft. of water per annum from the Middle Fork of the Feather River to be diverted in connection with its proposed $1,250,000 hydroelectric power project in Plumas County.

In connection with its Kings River project, which it is estimated will cost $10,000,000, the San Joaquin Light & Power Corporation, Fresno, Calif., has applied for 330 sec.ft. of water for diversion from the North Fork of the Kings River, Fleming Creek, Post Corral Creek and Helms Creek, tributary to the North Fork of the Kings River and Kings River, and 86,000 acre-ft. storage per annum, in Fresno County, for the generation of 60,750 theoretical horsepower.

Plan Power Project on Jamison Creek, Plumas Co., Calif.

Application has been made to the Federal Power Commission by Swayne, Leland & Turner, San Francisco, for a preliminary permit covering a power project on Jamison Creek and its tributaries in Plumas County, Calif. The project is near the towns of Johnsville and Blairsden. It is proposed to construct four reservoirs drawing water from Eureka Lake, Deer Creek and Poplar Creek. A ditch and flume will carry the water 4,600 ft. from Deer Creek to Eureka Lake, thence through an iron pipe to power house No. 1.

Eureka Lake stores 2,600 acre-ft. Reservoirs A, B and C would have a storage capacity of 4,800 acre-ft. Power plant No. 2 will be in Jameson City and will operate under a head of 426 ft. Power plant No. 3 will have a head of 416 ft. The total primary power which this development would make available is 5,195 hp. The power is for public utility use.

Defunct Utility to Be Sold at Auction.—The defunct Sherman County Light & Power Company at Centralia, Wash., operating in Lewis County, will be sold at auction Sept. 16 to satisfy a judgment for $259,251.71 recently given in the superior court in favor of the Portland Trust & Savings Bank. Property to be sold includes a transmission line between Centralia and Chehalis.

Irrigation District Application for Rights Reconsidered

In view of new data submitted by the Nevada Irrigation District in connection with its application for rights on the Yuba River, the staff of the Federal Power Commission is reconsidering the matter. The executive secretary of the commission on June 6 tentatively rejected the application of the irrigation district but with the proviso that consideration would be given additional information bearing on the project and calling attention to the right of the applicant to carry the case before the three cabinet officers who form the commission. The irrigation district has decided to avail itself of that suggestion in case the staff of the commission on reconsideration should report unfavorably.

The commission's engineers questioned some of the estimates which had been made on construction work. The irrigation district now presents actual bids to substantiate its figures as to the cost of structures.

The application of the irrigation district is in conflict with those of the Yuba River Power Company and the Excelsior Power and Water Company. The application of the Excelsior company also was rejected, and the Yuba River company was asked to establish its state rights.

Final Hearing on Girand Colorado River Project Oct. 20

The final hearing before the Federal Power Commission in connection with the Girand project at Diamond Creek on the Colorado River (Journal of Electricity, Aug. 1, 1924, p. 104 and Dec. 1, 1924, p. 416), has been postponed until Oct. 20. The time had been fixed tentatively for the first week in September, but on the application of those opposing the license and with the concurrence of Mr. Girand, the commission has set the new date.

The commission asks that objections be filed in writing prior to the meeting, but an opportunity for oral argument will be afforded at the hearing, regardless of whether documents have been filed.

Electric Sugar Mill to Be Erected in Colorado.—The construction of two factories, both to be electrically operated, has been announced by the Great Westtern Sugar Company with headquarters in Denver. The first is at Johnstown, Colo., and the second at Ovid, Colo., in the northeastern part of the state, where a new town will be established as a result of the decision to locate a factory at that point. Whether or not the Industrial Sugar Company plant at Fort Lupton, Colo., which has just been purchased by the Great Western company, will be removed to either of the places named is uncertain. The latter plant was constructed at the same time as its neighbor at Brighton, said to be the model plant of the company. The Great Western is also making extensive additions to its Steffens molasses plant at Fort Collins.

Panama Lamp & Commercial Company Receives San Francisco Contract.—The contract for one year to furnish lamps for the city of San Francisco recently was awarded to the Pamana Lamp & Commercial Company, 1066 Mission Street, San Francisco.

Construction Program of Southern Colorado Power Company

Surveys have been completed for the new 66,000-volt transmission line to be built by the Southern Colorado Power Company, Pueblo, between that point and Canon City, according to W. N. Clark, general manager. The line will be used to increase the power service in both the Pueblo and Canon City districts and also to afford greater interchange capacity between the Pueblo steam plant and the steam plant at Canon City. Plans and specifications for new receiving stations at both ends of the line have been prepared.

The company is investigating the practicability of developing water power on Grape Creek near Canon City and also on Beaver Creek below the present Skaguay hydroelectric plant, there being a fall of about 1,500 ft. within a comparatively short distance of that plant. Comparison then will be made between the cost of developing this hydroelectric power and the construction and operating costs of additional steam plant capacity.

To provide for the increased business in the La Junta district, including the town of Las Animas, plans and specifications have been prepared for increasing the capacity of the La Junta substation.

Westinghouse Electric Company of Japan Newly Organized

The Westinghouse Electric Company of Japan, incorporated under the laws of the State of Delaware with a capital of $1,000,000, is a newly organized subsidiary of the Westinghouse Electric International Company. The officers of the new company are: Guy E. Tripp, chairman; L. A. Osborne, president; E. D. Kilburn, vice-president; and I. F. Baker, managing director, located at Tokyo.

The purposes of this company, according to Mr. Kilburn, are to distribute Westinghouse products throughout Japan and to arrange for proper service to the many old as well as the new users of Westinghouse apparatus in Japan. The staff in Japan will be almost entirely Japanese.

Plans Well Under Way for Meeting at Camp Cooperation V

Great interest is being manifested in Camp Cooperation V, the fourth conference of electrical leagues to be held at Association Island, Henderson Harbor, N. Y., Sept. 8-12, according to advices from The Society for Electrical Development, Inc., which, in cooperation with the League Council, is sponsoring the meeting.

The conference will open Tuesday morning with a flag-raising ceremony followed by an address of welcome by W. W. Freeman, president of The Society for Electrical Development. The first actual business meeting is scheduled for Tuesday evening, at which Earl Whitehorne, commercial editor, Electrical World, New York, will speak on "The Status of the Leagues Today." This will be followed by five-minute reports by fourteen leagues and general discussion.

"Organizing a League," "Planning and Managing the League's Activities," "Keeping League Supporters Informed," and "The Social Side of the League's Activities" are some of the subjects to be discussed on Wednesday. Among the topics on the program for Thursday are "Local League Work from a National Viewpoint," "Local Legislation and Application", "League Activities in the Industrial Field", "Industrial Lighting Campaign", "Organizing the Industry for Massed Effort Nationally", and "What Women Want to Know About Electricity in the Home".

"The Red Seal Plan" is to be discussed on Friday by W. L. Goodwin who also will give the summing-up of the League Conference. There will also be five-minute reports on local operation, committee reports, open questions and discussion, and a banquet will be given in the evening. On Saturday morning league secretaries and secretary-managers will hold a special session.

The sports committee has made plans for golf, tennis, boating, yachting, swimming and other recreation, and other committees have been formed to take charge of reception, transportation, entertainment and other details.

Horse Mesa Dam Excavation to Be Completed in October

Work on the excavation for the Horse Mesa dam of the Salt River Valley Water Users' Association is expected to be completed late in October, according to recent press dispatches, when pouring of the cement for the foundation will be started. Jan. 1, 1926, is set as the estimated date when the dam will be finished.

This structure, which is being erected about 17 miles below the association's Roosevelt dam, will be 300 ft. high and will impound 300,000 acre-ft. of water (Journal of Electricity, Oct. 15, 1924, p. 302). The plant, in which three generating units will be installed, will have a capacity of 34,000 kw.

Petition Approved for Ornamental Street Lighting on East Orange Grove Avenue, Pasadena.—Petition of seventy-five property owners to have an ornamental lighting system installed on East Orange Grove Avenue, between Hill and Allen Avenues, Pasadena, Calif., has been approved by the city board of directors.

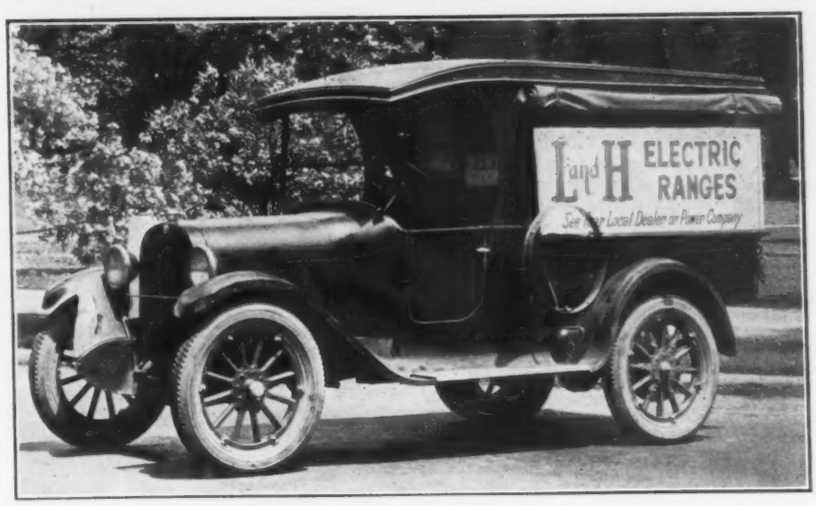
Illuminating Engineers Discuss Lighting Safety Orders

Recommendations for the General Lighting Safety Orders of the Industrial Accident Commission of California were discussed at a recent meeting of the San Francisco Bay Cities Chapter of the Illuminating Engineering Society. A committee from the organization appeared before the commission at a public hearing held at the State Building, San Francisco, on Aug. 18. At this hearing it was decided that the Orders would remain as they are at present until such time as the commission is ready to consider a revision of the General Safety Orders.

It is the opinion of the commission that an attempt should be made to simplify the General Lighting Safety Orders as they now exist so that they may be more readily understandable. It was requested that the Illuminating Engineering Society appoint a committee to prepare a suggested set of Lighting Safety Orders to be used as a basis in preparing the tentative Orders at the time of the revision. This committee is expected to present its report within six months.

Light Department of Tacoma, Wash., Files Budget.—Expenditures of the municipal light department of Tacoma, Wash., for 1926 will amount to approximately $2,600,000, according to the budget estimate filed with the city controller by Ira Davisson, commissioner of light and water. This amount is $300,000 under the actual expenditures for the last fiscal year, which totaled $2,915,274. The net income of the department for the first six months of 1925, ending June 30, was $481,223.77, and operating revenues amounted to $789,603.15, according to report recently submitted by Mr. Davisson.

Monroe City, Utah, Applies for License for Auxiliary Plant.—Monroe City, Utah, has applied for a license covering a proposed auxiliary plant to be constructed on Monroe Creek near an existing municipal plant. Only 147 hp. of primary power is available. It is planned to make emergency use only of the proposed development.



To cooperate with both dealers and power companies Alexander & Lavenson Electrical Supply Company, San Francisco, is sending through northern and central California the truck, shown above, in which are two models of the L & H electre range. The ranges are taken from town to town and are exhibited and demonstrated wherever it is thought practical.

Ultimatum Delivered by Governor Hunt at Tri-State Meeting

Confronted by an ultimatum from Governor Hunt outlining Arizona's stand with reference to any development of the Colorado River, a tri-state conference between California, Nevada and Arizona called for the purpose of discussing the mutual interests of those states broke up following its initial meeting on Aug. 17, 1925, at Phoenix, Ariz.

The conference was between committees appointed by the California and Nevada legislatures and a committee appointed by Governor Hunt to take preference over a similar body of representatives appointed by the Arizona legislature.

In his speech before the conference Governor Hunt made an extended attack on the Colorado River Compact and enunciated the principle that Arizona expects to become proprietor state over any development of the river within its border and to "derive revenue from any development of the river in whatever manner the laws devise." He implied that Arizona was experiencing no pressing need for development of the river and is willing to retard development until the other states are willing to purchase water and power or until the needs of Arizona dictate action. Governor Hunt's speech will be published in full in the next issue of the Journal of Electricity.

In the meantime the upper basin states tentatively had set Aug. 27 as the date for a meeting at Denver of representatives of Utah, Colorado, Wyoming, and New Mexico for the purpose of coming to some agreement whereby the resources of the stream may be utilized.

Report on Potential Water Power Along Columbia River

One-seventh of the potential water power in the United States is to be found along the Columbia River, exclusive of the very large power resources of its tributaries, according to a recent announcement of the Department of the Interior. This department, through the Geological Survey and other bureaus, gradually has been accumulating the records needed for determining the possibilities of utilizing the Columbia River.

Over 8,000,000 acres of land can be irrigated within the drainage area of Columbia River, of which about 3,600,000 acres are irrigated now. The river can be made navigable from its mouth to the international boundary, a distance of 760 miles, if proper foresight is exercised in the location of dams constructed primarily for use in developing water power.

The engineers of the Geological Survey have made several preliminary estimates of the water-power resources of the Columbia River proper. The latest estimate, shown in the accompanying table, takes into account all factors which are likely to influence the flow in the future.

The regulated flow as given in the table represents the flow estimated to be available when ultimate possibilities for irrigation have been served; when allowance has been made for a supply sufficient to maintain navigation, amounting to 500 sec.ft., above Wenatchee River, 750 sec.ft. between Wenatchee and Snake Rivers, and 1,000 sec.ft. below Snake River; and when storage has been regulated for the direct benefit of power sites immediately below reservoir sites at Hungry Horse (South Fork of Flathead River), 1,200,000 acre-ft.; Flathead Lake, 1,600,000 acre-ft.; Priest Lake, 360,000 acre-ft.; Chelan Lake, 450,000 acre-ft.; Wenatchee Lake, 835,000 acre-ft.; and Chiwawa, 318,000 acre-ft. Utilization of the storage available in Pend Oreille and Coeur d'Alene Lakes is assumed to be necessary for the development of the Columbia Basin irrigation project.

SUMMARY OF POTENTIAL POWER ALONG COLUMBIA RIVER FROM THE INTERNATIONAL BOUNDARY TO ITS MOUTH

(Horsepower at 70 per cent efficiency)

Sites and Stretches	90 per cent of the time	50 per cent of the time
At nine dam sites:		
Natural flow	2,726,000	5,427,000
Regulated flow	3,297,000	5,480,000
In stretches within which information is inadequate for determining sites:		
Natural flow	1,228,000	2,415,000
Regulated flow	1,498,000	2,497,000
Total:		
Natural flow	3,954,000	7,842,000
Regulated flow	4,795,000	7,977,000
Total in Washington:		
Natural flow	3,108,000	6,354,000
Regulated flow	3,846,000	6,568,000
Total in Oregon:		
Natural flow	846,000	1,488,000
Regulated flow	949,000	1,408,000

Utility Awards Prizes to Winners in Employees' Examination

Awarding of prizes to the twenty contestants receiving the highest grades in the recent examination held for the employees of the Los Angeles Gas and Electric Corporation took place Aug. 7 at an enthusiastic gathering in the assembly hall of the company's building. William Baurhyte, president, A. B. Day, vice-president and general manager, and other company officials were present. One hundred and ten employees were enrolled in the examination, which was the culmination of a six

N. H. BRADSHAW

weeks course of lectures and study covering the utility's gas and electric manufacturing and distributing systems, general office routine, and other matters of information about the conduct of the corporation's business.

The first prize, a trip as the guest of the corporation to the convention of the Pacific Coast Gas Association, held at Portland, Ore., Aug. 17-21, was won by N. H. Bradshaw of the accounting department with a score of 99½ per cent.

The other nineteen prize winners, in the order of their grades were: C. D. Cushman, W. M. Fisher, William Maddock, G. M. Sadler, F. O. Young, M. L. Cornforth, P. C. Kuntz, W. C. F. West, P. A. Patchen, W. C. Houser, F. L. Washburn, P. R. Aikman, F. L. Moon, L. V. Eddy, R. M. Robinson, Calvert Coates, L. S. Pederson, F. S. Gillellan, A. T. Vawter. These men received prizes of useful electrical appliances, silverware, fishing equipment and the like.

Exide Battery Assembly Plant to Be Built in San Francisco

Announcement has been made that the Electric Storage Battery Company, of Philadelphia, manufacturers of Exide batteries, is planning the erection of a large assembling plant and warehouse for the purpose of rendering better service to its customers on the Pacific Coast and in the Hawaiian Islands.

The company has purchased a piece of property on Third Street, just north of Paul Avenue, with an area of 82,500 sq. ft., on which it plans to erect a modern factory-type reinforced concrete building at an estimated cost of $200,000, exclusive of the cost of the property. In the rear end of the structure, which will be one-story in height at that point, about 45,000 sq. ft. of space will be provided for assembling, shipping and warehousing. The front of the building will be two stories high, the general offices of the branch to occupy the top floor.

G. R. Murphy, manager of the Pacific Coast division, is quoted as saying that the steady growth of the business had decided company officials to change the policy of leasing headquarters and establish a permanent home on the Pacific Coast for the better service of its customers.

Los Angeles Seeks Uniform Type of Ornamental Lighting Posts.—Hoping to effect economies through the application of the principles of standardization, the Los Angeles city council has requested the assistance of the city attorney and the city art commission in the obtaining of a new type of ornamental lighting post which may be used by any of the manufacturers. At present the posts used are patented, and each company can set any price it wants on its product. It also was pointed out that with a uniform style of posts the city will present a better appearance. In several sections, two or more types of posts now are being installed on the same street.

Washington Utility Secures Street-Lighting Contract.—The city council of Toledo, Wash., has awarded to the Puget Sound Power & Light Company a contract for furnishing street lighting current for a period of ten years.

Electric Home at Aurora, Colo., to Be Community Affair

An electric home to be displayed as a community affair shortly will be featured at Aurora, Colo., a suburb of Denver. Although the local central station is interested in the activity, other business men, including a prominent banker, have supplied the necessary funds for advertising and displaying the home, which is said to be of an unusual type of construction and the largest residence to be built in that suburban community.

When the home is completed and furnished, it will be displayed with younger members of the Women's Commercial Club of Aurora serving as hostesses. Entertainment features to be held nightly at the home include aeroplane flights, band concerts, army maneuvers and other spectacular events that are likely to attract a considerable number of visitors from the city.

The home is located on one of the main paved thoroughfares leading eastward out of Denver, and occupies a commanding position at the entrance to the town of Aurora. Business men of the town feel that the home, together with the entertainment features, should prove a real community attraction and one that will advertise Aurora.

Frank Gilligan, owner of the home and former utility man, and C. A. Einfeldt, head of the Suburban Light & Power Company, together with Merle Jordan, local manager of that company, are the key men in the undertaking. The Electrical Cooperative League of Denver is serving as adviser and counsel in the undertaking.

Pacific States Electric Company Opens San Diego Branch

The ninth branch office and warehouse of the Pacific States Electric Company recently was opened at 206 West Market Street, San Diego, Calif. It will carry full stocks on a complete line of electrical merchandise. R. A. Pearson has charge of the new branch, having been transferred from the Portland branch of the company.

The Pacific States Electric Company now has branches in San Diego, Los Angeles, Long Beach, San Francisco, and Oakland, all in California; Phoenix, Ariz.; Portland, Ore.; Seattle and Spokane, Wash. The opening of this additional store is another indication of the firm's optimism and faith in the future of the electrical industry on the Pacific Coast.

Herbert Hoover Is to Speak at Glenwood Convention

Herbert Hoover, Secretary of Commerce, and one of the principal speakers at the recent N.E.L.A. convention in San Francisco, has accepted an invitation to be the principal speaker at the annual joint convention of the Rocky Mountain division, N.E.L.A. and Colorado Public Service Association at Glenwood Springs, Colo., Sept. 14-17. "State versus Federal Regulation" will be the subject of Mr. Hoover's address Wednesday night, Sept. 16. Arrangements have been completed for broadcasting it from KOA, General Electric station in Denver.

Other speakers of national importance who will appear on the convention program are Miss R. E. McKee, M. H. Aylesworth, W. R. Putnam, and Merrill Thorpe. Heber R. Harper, Chancellor of the University of Denver, and L. Ward Bannister, president of the Denver Chamber of Commerce and a member of Secretary Hoover's Colorado River commission also are listed as speakers.

The convention this year will last four days instead of three as heretofore. Morning and evening sessions will be held, leaving the afternoon for sports and entertainment. Aeroplane service will be maintained between Denver and Glenwood Springs for prominent guests and any who may arrive late for the convention.

B.C. Electric's Option for Bridge River Site to Be Renewed

In view of the inability to complete diamond-drill borings at the dam site of the proposed Bridge River hydroelectric project located about 125 miles from Vancouver, the option to purchase the project held by the British Columbia Electric Railway Company, Ltd., will be renewed by the Bridge River Power Company, holder of the original water rights, according to reports from Vancouver.

The option was secured in order that studies might be made to compare the advantages of the Bridge River development with that of the proposed Ruskin plant some three miles below the existing plant of the company on Stave River. One of these two projects is believed to be the next logical addition to the company's system.

Edison Company to Start Work on Shaver Lake Railroad

Work on five miles of single-track, standard gage railroad between Dawn station on the San Joaquin & Eastern Railroad and Shaver Lake is to be commenced immediately by the Southern California Edison Company. This line is to be built to transport the materials which are to be used in the construction of the combination conduit and tunnel between Huntington and Shaver Lakes and of the dam to be erected at Shaver Lake.

Climax locomotives such as are used on the mountain grades by the San Joaquin & Eastern Railroad will be used. The road will have a maximum grade of 4 per cent. Present plans call for completion of the work Dec. 1, 1925.

Contracts for Cement Mill Electrical Equipment Awarded.—Contracts for the first units of the electrical equipment of the new cement plant at La Porte, twenty miles west of Fort Collins, Colo., that is being erected for the Colorado Portland Cement Company, Denver, have been let to the Westinghouse Electric & Manufacturing Company. Construction will start shortly. The completed mill will cost about a million and a half dollars. It will be electrified completely.

Tacoma Steam Plant Shut Down.—The city light department of Tacoma has closed its steam power plant for the summer, in the interest of economy, except for the turning of a generator as a regulation on voltage factors. The boilers will remain cold until September, any steam being needed to be purchased from the Consumers Central Heating Company.

California Wholesale Electric Opens Establishment

A new electrical supply jobbing house recently has been established in Los Angeles by five former employees of the Pacific States Electric Company. The company is incorporated under the name of the California Wholesale Electric Company. It has leased a recently completed two-story brick building at 413 East Eleventh Street that is well adapted to the needs of an electrical jobber, and provision has been made for efficient loading and unloading in order to facilitate service.

H. C. Chapman, president of the concern, has been district treasurer of the Pacific States Electric Company for the past ten years. E. G. Snow, the vice-president, had been with that company for fifteen years in various capacities. Tom Slee is secretary-treasurer; he was chief accountant in the former company for twelve years and later assistant district treasurer. W. D. Hughes, assistant secretary, was with the Pacific States company for more than five years. J. G. Cook, the other member of the firm, had been a salesman for the same company for several years.

The California Wholesale Electric Company is handling standard lines of merchandise and following the trade policies practiced by the highest type of supply jobbers.

Byllesby Interests Acquire Another Wyoming Central Station.— Another Wyoming central station has been taken over by the Byllesby interests and merged with the recently formed Mountain States Power Company in the purchase from the Illinois Power & Light Corporation of the Douglas Light & Power Company, Douglas, Wyo. The company will be directed from Casper, Wyo., by W. D. Johnston, manager of the central station in that city, formerly known as the Natrona Power Company. G. M. Brewer of Albany, Ore., is vice-president and general manager of the Mountain States Power Company.

Mayor Vetoes Appropriation of $13,000 Additional for Skagit Survey Commission.—Characterizing the proposed expenditure as "absolute waste" and an "irregular" payment of money to "satisfy some member or members of the city council who are desirous of making a name for themselves," E. J. Brown, mayor of Seattle, recently vetoed an appropriation of $13,000 for the employment of engineers to continue the city of Seattle's survey of the Skagit power project (Journal of Electricity, Feb. 15, 1925, p. 147). A similar appropriation of $12,000 several months ago was passed over the mayor's veto. The mayor holds that the commission was created illegally and that the investigation should be made by the city engineer's department.

Pasadena Considers Installation of Ornamental Lighting System on Certain Streets.—The Board of City Directors of Pasadena is considering the installation of an ornamental lighting system between Meredith and Santa Anita Streets and also on North Fair Oaks Avenue from Chestnut to Hammond Street. No decision has been reached as to type of posts to be used, but union metal posts seem to be favored.

News of the Electragists

H. H. Walker and C. F. Butte Head California Electragists

H. H. Walker, president of the California Electragists, started his career in the electrical industry in 1897 with the Southern California Edison Company. In 1914 he entered the electrical contracting business for himself. Mr. Walker is president of the Electrical Contractors and Dealers Association of Los Angeles, and chairman of the Southern Division of the California Electragists, in addition to the state organization. He fathered the amalgamation of the contractors of southern California with the Electragists. He is a member of the advisory committee of the California Electrical Bureau, a charter member of the Electric Club, and belongs to many civic and athletic organizations. Mr. Walker represents the Electragists on the construction industries joint committee of southern California. It is the duty of this committee to endeavor to have all public work done by the contract method. Its activity covers the entire state.

H. H. WALKER

Policies to be executed during his administration include: 1. Endeavor to carry out the Electragists' idea and thoroughly establish the name "Electragist" as representing responsible contractor-dealers. 2. Support the Red Seal Plan as being one of the most important and feasible programs before the electrical industry and one which will assist all branches. 3. Continue the efforts of the association to educate all contractors to conduct their business along lines of proper business ethics, working especially with the smaller contractors just starting in the business so they will be imbued thoroughly with Electragists' ideals as they advance in the business world.

C. Felix Butte, vice-president of the California Electragists and chairman of the Northern Division, was born and raised in San Francisco. During school vacations he worked for the old California Electrical Works and the Electrical Supply Company. After completing his education in 1903, Mr. Butte became assistant to the superintendent of the Pacific Telephone and Telegraph Company. He later was in charge of the engineering department of the Western Electric Company of San Francisco. In 1909 he purchased a half interest in the Butte Engineering and Electric Company, and upon the dissolution of this firm in 1919 he formed the Butte Electrical Equipment Company with himself as owner. Mr. Butte is a member of the Electrical Development League, the National Credit Association, the Builders Exchange and many other business and civic organizations.

C. FELIX BUTTE

In a recent interview, Mr. Butte stated it would be his endeavor to consummate the following policies in the Northern Division: I. Secure satisfactory attendance at all meetings by having subjects of vital interest to all members presented at the sessions. 2. Maintain closer human relationship between members. 3. Advocate the adoption of logical channels of trade. 4. Adoption of sound business standards and principles. 5. Maintenance of membership interest by closer contact between the various sections. 6. Aid the activities of the California Electrical Bureau. 7. Universal adoption of the Red Seal Plan. 8. Harmonious relationship between competitors. 9. Publicity through the columns of the Journal of Electricity. A more detailed account of these activities will be given in future issues of the Journal.

Electragists, International, Plan Quarter-Centennial Meeting

Plans have been completed for the twenty-fifth annual convention of the Association of Electragists, International, which will be held Sept. 23-25, at the West Baden Hotel, West Baden, Ind. J. H. Trumbull, governor of Connecticut, president of The Trumbull Electric Manufacturing Company, and former electrical contractor, will make the principal address before the convention.

All of the afternoon sessions of the convention will be executive sessions to which active members of the Electragists' association will be the only persons admitted. This is a departure from past precedent and undoubtedly will result in much freer discussion of the subjects before the delegates. The morning sessions will be open meetings, as in the past.

The very comprehensive program which has been prepared should make the results of this convention the most far-reaching of any convention of contractor-dealers that ever has been held. The trade policy report, code committee report, and labor section meetings, which will be taken up in the executive sessions are sure to cause considerable discussion by the delegates.

Addresses at the morning sessions will include "The Jobbers' View of Distribution," by O. Fred Rost; "Uniform Electrical Ordinance", by S. L. Nicholson; and one by Sherman L. Rogers, associate editor "Success". Various committee reports and discussions also will occupy the attention of the delegates.

The manufacturers' exhibit promises to be larger than that of last year when forty-four manufacturers displayed their products.

The entertainment committee has arranged a splendid program, and special emphasis has been placed on the entertainment of the ladies who will be present. From present indications a representative body of electragists from all parts of the country is planning to be present.

Organization Formed in Siskiyou County by Contractors

The Siskiyou County Electric Contractor-Dealer Association recently was organized at a meeting in Dunsmuir of contractors from that city, Yreka, Mt. Shasta, and Montague. The following are the charter members of the organization: Seavey Brothers, Dunsmuir, Electric Supply Company, and H. C. Schultz, both of Yreka; Tex Electric Shop, Mt. Shasta; and I. N. Scammell, Montague. J. A. Seavey, Dunsmuir, was elected president, and E. G. Millbourn, Yreka, secretary-treasurer.

Regular monthly meetings will be held on the second Monday of each month. The next regular meeting will be held in Yreka on July 13, opening with a banquet at the Yreka Inn at 7 p.m. At this meeting it is planned to discuss wiring methods and costs of installing electric ranges. Members and representatives of similar organizations are invited to attend. Future meetings will be held at the different cities in the following order: Yreka, Mt. Shasta, Montague and Dunsmuir.

Oakland Association Elects Officers.—The Electrical Contractors and Dealers Association of Alameda County recently elected the following officers; president, Henry Mellmann, Mellmann Electric Company; vice-president, C. D. Bronson, California Electrical Construction Company; treasurer, G. H. Andrews, Andrews Electric Company. Executive committeemen: A. R. Kolls, NePage-McKenney Company; E. C. Heister, Advance Electric Company; Walter Spencer, Spencer Electric Company. Laurence R. Chilcote is secretary-manager of the association.

Seth Cohn, of the **Atlas Electric Company** recently has moved into a new store at 233 Third Avenue, San Mateo, Calif. Mr. Cohn has been in business in San Mateo for the past eighteen years.

C. R. Hagen is now the proprietor of **Hagen & Harris,** 1125 Main Street, Napa.

Meetings

Advisory Committee of California Electrical Bureau Meets

Educational advertising to promote the extended use of electricity in agriculture, the Red Seal campaign, tentative administrative plans, and approval of the continued use of the traveling window lighting exhibit were among the important subjects discussed at a meeting of the advisory committee of the California Electrical Bureau held in Los Angeles Aug. 13.

R. E. Fisher, vice-president in charge of public relations and sales, Pacific Gas and Electric Company, San Francisco, and chairman of the advisory committee, presided. Attention was drawn to the forthcoming Camp Cooperation V to be held at Association Island, Henderson Harbor, New York, Sept. 8-12, under the auspices of the Society for Electrical Development, Inc., and Mr. Fisher was named to attend as representative of the Bureau.

W. L. Frost, general commercial manager, Southern California Edison Company, Los Angeles, reporting on the preliminary promotional work in behalf of the Red Seal campaign, spoke highly of the beneficial results achieved through the visit of H. L. Harper to the convention of the Electragists at San Diego, while H. H. Courtright, president and general manager, Valley Electrical Supply Company, Fresno, reported similar results at the Eureka convention of the northern division of the Electragists. Mr. Courtright also reported that a special campaign for the sale of appliances conducted by the Valley Electrical Supply Company during June Bride Week brought the sale of appliances for that period to a point more than 10 per cent in excess of the company's Christmas sales.

During the session it was brought out that nearly 2,000 copies of the Handbook of Electric Appliance Information have been distributed within the industry, and that a number of commendatory letters from various sources have been received on this work.

The terms of office of R. E. Fisher, W. S. Berry, P. H. Booth, W. L. Frost, H. H. Walker and F. H. Woodward having expired at the end of July, C. T. Hutchinson was elected chairman of the advisory committee, succeeding R. E. Fisher. The other vacancies on the board have not been filled yet, present incumbents holding office until their successors have been appointed.

The board approved a tentative plan for the administration of the Bureau presented by Mr. Fisher in behalf of the chairman-elect, with special recommendation that immediate attention be given to the active promotion of the merchandising division of the Electragists.

H. M. Crawford, sales manager, Pacific Gas and Electric Company, was elected to succeed R. E. Fisher as a member of the advisory committee. The committee unanimously expressed its sincere appreciation and thanks to Mr. Fisher for the time and effort that he has given to the promotion of the Bureau, and a committee has been appointed to draft suitable resolutions to this effect.

A committee also was appointed to draft resolutions of regret at the death of T. E. Bibbins, president of the Pacific States Electric Company, expressing the great sense of loss to the industry by his passing.

Approval was given the plan submitted by Mr. Fisher providing for the continued use of the Bureau's traveling window lighting exhibit by each power company in the state. In view of the fact that the Pacific Gas and Electric Company offered to undertake this work within its own district immediately, the committee was unanimous in expressing its approval.

COMING EVENTS

National Radio Exhibition—
Third Annual—Los Angeles, Calif.
Sept. 5-12, 1925

Camp Cooperation V—
Conference of representatives of local electrical leagues—Association Island
Henderson Harbor, N. Y.
Sept. 8-12, 1925

Rocky Mountain Geographic Division, N.E.L.A.—
Annual Meeting—Glenwood Springs, Colo.
Sept. 14-17, 1925

Colorado Public Service Association—
Quarterly Meeting—Glenwood Springs, Colo.
Sept. 14-17, 1925

American Institute of Electrical Engineers—
Pacific Coast Convention—Seattle, Wash.
Sept. 15-17, 1925

Association of Electragists, International—
Annual Convention—West Baden, Ind.
Sept. 23-25, 1925

Electrical Supply Jobbers Association—Pacific Division—
Quarterly Meeting—Hotel Del Monte, Del Monte, Calif.
Sept. 24-26, 1925.

California Association of Electrical Inspectors—
Semi-Annual Meeting—Fresno, Calif.
Sept. 24-26, 1925.

Puget Sound Company Employees Enjoy Annual Picnic

The annual picnic of the Puget Sound Power & Light Company, Seattle, Wash., held at the company's resort on Lake Tapps, Sunday, Aug. 9, was voted the most successful in the history of the organization by the 2,000 employees, their families and friends who were present.

Under ideal weather conditions, except a slightly smoky atmosphere due to forest fires, the day was devoted to outdoor sports of every kind—foot-races for men, women and children, novelty races, a nail-driving contest, pole-climbing, and line-throwing, swimming races, boat races, a duck-chasing contest and a variety of other amusements. Dancing was enjoyed in the evening.

The grand prize for the best all-around athlete was awarded to R. M. Boykin, manager of the Seattle division, who not only took second place in the horseshoe throwing turnament but also defeated Captain Norwood W. Brockett, director of public relations, in a special exhibition 50-yard dash. Mr. Boykin made the remarkable time of 3.2 seconds in this event which, those who saw the race confidently believe, would have established a new world record for the distance had it not been for the fact that the official timekeeper used an egg-boiler.

Much of the success of the event was due to the indefatigable efforts of James B. Spellar, chairman of the recreation committee, and to W. B. Donaldson, chairman of the picnic committee.

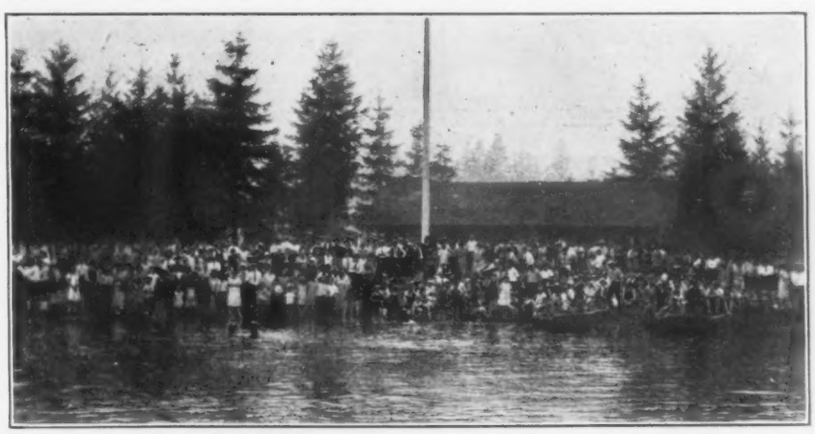
Supply Jobbers to Hold Quarterly Meeting Sept. 24-26

The quarterly meeting of the Pacific Division of the Electrical Supply Jobbers Association will be held at the Hotel Del Monte, Del Monte, Calif., Sept. 24-26.

This meeting is the first of the new fiscal year and will be an important one, according to Albert H. Elliot, secretary, who requests that reservations be made promptly.

Electrical Inspectors to Meet in Fresno.—The semi-annual meeting of the California Association of Electrical Inspectors will be held in Fresno Sept. 24-26. This meeting will be under the chairmanship of R. W. Abright of Long Beach, who took over the duties of the office Aug. 1. The Electrical Safety Orders of the Industrial Accident Commission and the 1925 National Electrical Code are expected to be in print by that date, and uniform interpretations of these undoubtedly will be discussed by the delegates.

Kelso, Wash., Awards Street Lighting Contract.—The city council of Kelso, Wash., recently awarded contract for ornamental street-lighting system on Main Street to Leon Hampton, Inc., of Longview, Wash.



About 2,000 employees, with their families and friends, enjoyed the annual picnic of the Puget Sound Power & Light Company held at Lake Tapps, Aug. 9, 1925.

Personals

Samuel Kahn, vice-president and general manager of the Western States Gas & Electric Company, Stockton, Calif., and director of the Standard Gas & Electric Company, the holding company of the former, a Byllesby property, in addition to numerous other duties, is

SAMUEL KAHN

president of the Stockton Chamber of Commerce. Mr. Kahn has had a wide experience in the utility field, having been associated during his career with the San Antonio Gas & Electric Company, the San Antonio Traction Company, the Union Light, Heat & Power Company of Fargo, N. D., the Appalachian Power Company of West Virginia and Virginia, and the Tacoma Gas Company, Tacoma, Wash. He joined the Western States Gas & Electric Company in 1913 and has held his present position as vice-president and general manager since that time. He is also vice-president of the Sierra & San Francisco Power Company, another Byllesby property, under lease by the Pacific Gas and Electric Company. Mr. Kahn has always taken an active part in Stockton's civic affairs. He has been a director of the Chamber of Commerce for a number of years and is chairman of its deep waterway committee. He was born in San Antonio, Texas, and graduated from Purdue University in 1903 with the degree of electrical engineer.

J. J. Farley of the Farley Electric Company, Fullerton, Calif., was a recent business visitor to Los Angeles.

L. R. Moran, formerly consulting industrial engineer in Eureka, Calif., recently has become an industrial engineer in Oakland for the Great Western Power Company, with offices at 1700 Broadway. Mr. Moran is a certified member of the American Association of Engineers and also of the American Society of Engineers.

R. G. Gentry and **O. A. Weller,** both of the Public Service Company of Colorado in Denver, recently attended and took part in the conference conducted by the Y.M.C.A. at Estes Park, Colo., which had as its motif "Christianity in Business."

R. B. Childs of the commercial department and **W. H. Ude,** director of public relations, The Washington Water Power Company, Spokane, recently spent four days in Wallace, Idaho, and vicinity, visiting important mining companies served by the power company.

H. E. Cook, illuminating engineer for the Edison Lamp Works of San Francisco, resigned Sept. 1 to accept a similar position with the Detroit Edison Company. He will have headquarters in Detroit, Mich.

Ernest P. Kipp, western sales manager of the Hazard Manufacturing Company with headquarters in Denver, recently visited San Francisco.

C. A. Semrad, commercial manager of the Public Service Company of Colorado, **G. O. Hodgson,** district manager of the Edison Lamp Works, **A. E. Bacon,** manager of the electrical department of the Mine & Smelter Supply Company, and **D. D. Sturgeon,** electragist, are members of the special committee appointed to formulate plans for the participation of the Electrical Cooperative League of Denver in the industrial lighting campaign which has been started throughout the United States.

S. E. Gates, manager, General Electric Company, Los Angeles, recently visited Spokane en route from the East. He visited old friends in the electrical industry, Spokane having been his home for many years until his transfer to Los Angeles in 1924.

R. A. Balzari, manager industrial division of the Westinghouse Electric & Manufacturing Company, San Francisco, is making an automobile trip into southern Oregon, after attending the convention of the California Electragists at Eureka.

Arnold Pfau, consulting engineer of the hydraulic department, **L. C. Nichols,** engineer in charge of transformer design, and **L. E. Bogen** of the electrical department of the Allis-Chalmers Manufacturing Company, Milwaukee, Wis., recently spent some time in California in connection with the electrical developments under way in that state.

G. L. Kollberg, manager of the pumping engine department of the Allis-Chalmbers Manufacturing Company, Milwaukee, Wis., was a recent San Francisco visitor.

G. W. Cole, formerly heavy-duty equipment specialist with the Utah Power & Light Company, Salt Lake City, recently arrived in San Francisco to take up a similar position with the Edison Electric Appliance Company, Inc.

F. M. Raymond, editor of the National City News, of National City, Calif., and formerly connected with the Arizona Gazette as sports editor, has been given the editorship of the "News-Meter", employee publication of the San Diego Consolidated Gas & Electric Company, to fill the vacancy created by the departure of W. A. Cyr. Supervising editorship of the "News-Meter" will be resumed by **R. C. Cavall,** superintendent of the record department of the San Diego utility, and original editor of "Glow".

E. J. Cipperly, industrial heating specialist for the Los Angeles office of the General Electric Company, was a recent visitor to San Diego, conferring with **H. B. May,** San Diego agent for the company.

J. C. Davidson, manager of the electrical department of the Hendrie & Bolthoff Manufacturing & Supply Company in Denver, was a recent West Coast visitor with his family enroute to Alaska.

Robert Miller, manager of the General Electric Company in the Mountain region with headquarters in Denver, has returned from the East where he attended a number of company conferences.

C. E. Magnusson, dean of the College of Engineering, University of Washington, Seattle, has been appointed chairman of the student branches committee of the American Institute of Electrical Engineers.

J. D. Sparks of the Majestic Electric Appliance Company, Seattle, lately visited Spokane in the course of a sales trip which included stops at Butte, Salt Lake City and Boise. Mr. Sparks was formerly with Landers, Frary & Clark of San Francisco.

H. M. Crawford, sales manager of the Pacific Gas and Electric Company, and **J. W. Wrenn,** assistant sales manager of the Great Western Power Company, San Francisco, explained the combined sales programs of those companies to the electragists at their recent convention at Eureka.

Murray Bourne, associated with the San Joaquin Light & Power Corporation, Fresno, Calif., was a recent visitor in San Francisco.

O. N. Robertson of the Robertson Electric Company, Santa Ana, Calif., was in Los Angeles recently on business.

F. L. Botsford and **L. J. Fulcher** of the United Commercial Company; **J. W. Thompson,** Leo J. Meyberg Company, and **R. B. Plass,** Westinghouse Electric & Manufacturing Company, have recently become members of the San Francisco Electrical Development League.

F. V. Boller, widely known throughout the electrical industry on the Pacific Coast, is now manager of the stock sales department of the San Joaquin Light & Power Corporation, Fresno, Calif., succeeding F. A. Easton.

F. V. BOLLER

Mr. Boller's promotion is recognition of long and efficient service rendered in many different departments of the company. He has been in turn manager of Coalinga, Santa Maria and Madera districts, head of the right-of-way department, and more recently assistant manager of the commerical department.

D. D. Howse of the Electric Products Corporation and **H. G. Woodill** of the Safety Electric Products Corporation, recently returned to Los Angeles from an extensive trip through Canadian and Eastern cities.

H. B. Jenkins and his son, **Harry Jenkins**, of the Jenkins Electric Company, Redlands, Calif., made a recent business trip to Los Angeles.

A. M. Fitch of the Harrison-Fitch Electric Company, Pomona, Calif., was in Los Angeles on business recently.

G. I. Farman of the Sierra Madre Electric Company was a recent visitor to Los Angeles.

F. D. Bennett, proprietor of the Radio Equipment Company, Sacramento, was a recent visitor in San Francisco where he attended the Radio Exposition.

W. D. Ryan, illuminating expert, General Electric Company, Schenectady, N. Y., is in San Francisco, where he is in charge of the illumination for the California Diamond Jubilee celebration to be held in San Francisco, Sept. 5-12.

D. E. Harris, newly elected president of the Pacific States Electric Company of San Francisco, was a recent Los Angeles visitor. Accompanied by **Frank Airy**, manager of the Los Angeles house, he made a business trip to San Diego.

Nathan Levinson, formerly Pacific district radio specialist for the Western Electric Company, recently became head of the radio department for Hale Brothers, San Francisco.

L. M. Klauber, general superintendent of the San Diego Consolidated Gas & Electric Company, recently motored north with his family, stopping on his return at Portland to attend the Pacific Coast Gas Association convention.

W. L. Percey, who recently has been elected vice-president in charge of corporate contracts and documents of the Southern California Edison Company, Los Angeles, is one of the original group of men who make up the executive force of that company. Finding that life as a wholesale dry goods merchant was not to his liking, he left New Jersey in 1896, removed to Los

W. L. PERCEY

Angeles and joined the West Side Lighting Company, one of the predecessor companies of the present Edison company. Beginning as cashier, he worked up through the ranks until in 1906 he was made treasurer of the company, and has held that position up to the present time.

R. M. Jacks has been appointed sales manager of the Albert Sechrist Manufacturing Company, Denver, Colo.

E. N. Brown, of the Majestic Electric Appliance Company, San Francisco, recently visited Salt Lake City.

G. H. Bucher, assistant general manager, Westinghouse Electric International Company, left New York recently for Seattle, Wash., on his way to Japan where he will asist in the organization of the newly formed Westinghouse Electric Company of Japan. While in the Orient he will visit also China, the Philippine Islands and other Far East countries to make an investigation into the electrical business outlook in those countries.

Frank McGinley of the Harbor Electrical Company, Wilmington, Calif., has been appointed one of the commissioners of the Board of Public Safety and Building for the city of Los Angeles.

J. I. Hill, General Electric Company, Schenectady, N. Y., visited San Francisco recently in the interest of his firm.

H. A. Van Norman, who for the past year has been the Los Angeles city engineer, has been appointed assistant general manager of the Bureau of Water Works and Supply. In this newly created position Mr. Van Norman will carry on the work of the department under the direction of **William Mulholland**, chief engineer and general manager. It is the intention of Mr. Mulholland to devote his energy almost exclusively to the problems brought up in connection with the attempt to use the Colorado River as a source of water supply for the city of Los Angeles. **J. C. Shaw**, a member of the board of public utilities and engineering head of the Los Angeles office of McClintic Marshall Company, has been appointed to succeed Mr. Van Norman.

J. M. Evans, formerly city electrician for the city of Modesto, Calif., and more recently assistant electrical engineer for the State Division of Architecture at Sacramento, has been appointed an electrical engineer for the Board of Fire Underwriters of the Pacific. He will have charge of the electrical work for the board in southern California with headquarters in Los Angeles.

G. M. Boyles, KFAE, Pullman, Wash.; **R. V. Haller**, KGW, Portland, Ore.; **Ross Swift**, KJR, Seattle, Wash.; **E. J. Glade**, KSL, Salt Lake City, Utah; **G. Allison Phelps**, KNX, Hollywood, Calif.; **J. G. Daggett**, KHJ, Los Angeles; **Glenn Rice**, KFI, Los Angeles, and **C. E. Haymond**, KFOA, Seattle, Wash., radio announcers, were among the guests at the luncheon of the San Francisco Electrical Development League held during the recent Radio Exposition.

E. W. Weathers, of San Diego, after a year of private practice as consulting electrical engineer, has reassumed the agency for Howell Red Band motors in San Diego, and gone back into retail business.

W. L. Davis, for many years connected with the stores department of the San Diego Consolidated Gas & Electric Company, resigned recently to accept a position in the newly opened branch office of the Pacific States Electric Company in San Diego.

O. R. Redfern, supervisor of the seventh radio district, with headquarters in Seattle, was one of the speakers at the luncheon of the San Francisco Electrical Development League during the Radio Exposition.

E. C. Magruder, sales specialist for The Meadows Manufacturing Company of Bloomington, Ill., recently arrived in San Francisco to cooperate with jobbers and dealers in their sales plans. He has spent twenty-seven years in the field of electrical appliance merchandising. Mr. Magruder first entered the electrical industry with the Electric Washing Machine Company of Chicago. He later went with the Central Illinois Public Service Company, remaining in its employ for ten years. Prior to becoming affiliated with the Meadows Manufacturing Company, he had considerable ex-

E. C. MAGRUDER

perience with the Empire District Electric Company, a public utility holding of the H. L. Doherty Company in Kansas, Missouri, Oklahoma and Texas. Mr. Magruder travels all over the United States in connection with his work of building up sales plans for jobbers and dealers. His work is primarily that of creating new sales plans and ideas and actively supervising their execution. He expects to remain on the Pacific Coast for the next ninety days and during that time he will work with **C. A. Williams**, western sales manager for the company, with headquarters in San Francisco.

Albert Casper, general manager of the Vallejo Light & Power Company and **Edwin Pierce**, manager of the contracting department of that company, were among those present at the Electragists' convention in Eureka.

S. M. Goodwin, formerly an assistant secretary of the Interior, has resigned to become the representative in Washington of the Columbia Basin Irrigation League.

Obituary

A. M. Poindexter, head of the Poindexter Electrical Supply Company, Denver jobbing house, died Aug. 12 after an illness of several weeks. Mr. Poindexter was world-famous as a marksman, at one time having been named the best pistol shot in the United States. He was active in the civic development of the community in which he resided. He formerly served as a member of the advisory board of the Electrical Cooperative League in Denver.

TRADE NOTES

The Diamond Flasher Button Company has been organized in San Francisco for the manufacture of a new flasher for electric signs. The new device is exceedingly simple. It is of the diameter of a standard lamp socket and ¼ in. thick. It fits into the lamp socket beneath the lamp and operates on a thermostatic principle, turning the current on and off. It is designed for two speeds, sign flashing or a beacon light. The flasher is being distributed by the Associated Distributors, Inc., 639 Mission Street, San Francisco, and 314 Omar Street, Los Angeles.

Century Electric Company, St. Louis, Mo., has issued recently bulletin No. 38, which describes and illustrates its squirrel-cage induction polyphase motors.

Pass & Seymour, Inc., Syracuse, N. Y., has placed on the market a special new device for use in wiring old houses where loom boxes and the BX type of surface boxes are used frequently.

The Miller Company, Meriden, Conn., has added recently seventeen new fixtures to its fixture line. They are of the semi-Georgian design with many new improvements. The company also is introducing a new line of safety holders for commercial units. The new line includes ceiling and suspension fixtures in the plain and ornamental designs.

Acme Wire Company, New Haven, Conn., has completed a new catalog of its products containing full information on magnet wire, special insulated wires, coil windings and varnished insulating materials.

Delta-Star Electric Company, Chicago, has issued bulletin No. 12 describing its new line of standardized steel-tower outdoor substations intended for installation by utilities serving or customers buying power from high-tension distribution lines.

Electro-Vapor System Supply Company, Seattle, Wash., has secured the exclusive rights from the Electro- Vaporific System of Royal Oak, Mich., for the manufacture, sale and distribution of its products in the states of Oregon and Washington, and is preparing to place the electric-steam radiator and water-heater on the market.

The Hisey-Wolf Machine Company, Cincinnati, Ohio, has added a new "Hisey" heavy-duty grinder to its line of electric machines. The machine is illustrated and described in its new bulletin which will be mailed to the trade on request.

Chicago Fuse Manufacturing Company, Chicago, has placed on the market recently new gem sectional switch boxes with lath support and mounting bracket that save installation time. Many other features are embodied in this new installation it is claimed.

Coldwell Lawn Mower Company, Newburgh, N. Y., is issuing literature describing and illustrating the merits of its new product, the Coldwell electric lawn mower, which recently was completed after more than two years of development work and careful tests. The mower will be ready for the trade about the first of the year.

The Penn Lite Supply Company, specializing in lighting fixtures and fixture parts, both wholesale and retail, has been established in Denver at 14th and Glenarm Streets.

Arrow Electric Company, Hartford, Conn., has introduced a new fixture device known as the tumbler-type candle socket, which is described and illustrated in its new circular.

Holophane Glass Company, Inc., New York City, has issued recently a new booklet entitled "Streets That Are Safe," that has been prepared for distribution among municipal authorities and citzens who are interested in better street lighting.

Edison Electric Appliance Company, Inc., Chicago, has added several new numbers to its line recently, among them being a triplex grill under catalog No. G10; a Hotpoint traveling iron, No. 114F22; a Hotpoint toaster, No. T18 and a new model automatic range under catalog No. RA73.

R. M. Boykin (left) manager of the central district of the Puget Sound Power & Light Company outdistanced Captain Norwood W. Brockett (right), director of public relations, in a 50-yard foot race at the company's annual outing held recently at Lake Tapps. Mr. Boykin's dash was made in 3.2 seconds, according to the time-keeper's official stop-watch, an egg-boiler.

Norman-Hoffmann Bearings Corporaton, Stamford, Conn., has issued recently two new catalogs, "Hoffmann" describing its precision roller bearings for heavy loads and hard service, and "Norma," which describes its precision ball bearings, open and closed types. Both catalogs are well illustrated.

The Cutler-Hammer Manufacturing Company, Milwaukee, Wis., has purchased the business and patents of Payne Dean, Ltd. The Cutler-Hammer Manufacturing Company has manufactured the Dean valve-control apparatus and other equipment in the past, and it will continue the development and manufacture of these devices and also will market them.

Utica Products, Inc., Utica, N. Y., is the name of the former Xardell Company. The new firm, which was incorporated recently, will handle the Utica portable electric furnaces and other appliances.

General Electric Company, Schenectady, N. Y., has issued bulletin GEA-82, giving a history of the automatic stations, a general description of the apparatus, proofs of the economy of operation, scheme of operation, supervisory control, plans for apparatus arrangement and a list of typical railway installations.

The Engineering Corporation, Long Beach, Calif., has developed an electrical recording smoke-detector to be attached to boilers that it is claimed will give the boiler operator immediate warning of any tendency of his furnace to cause smoke.

Sangamo Electric Company, Springfield, Ill., has developed a new lower bearing construction for its type D-5 direct current watthour meters, which it is claimed has many advantages over the old type.

The Servel Corporation, 17 East 42d Street, New York, recently has announced the purchase of a 50 per cent interest in its business by a group of well known electric light and power executives. The company will be operated under the direction of H. G. Scott, who has resigned as vice-president of the Columbia Gas & Electric Company of Charleston, W. Va., to become chairman of the board and executive committee.

The White Lighting Fixture Studio is the name of the lighting fixture and supplies firm formerly conducted by P. B. Lockwood and A. White at 711 Mission Street, San Francisco. Mr. White has taken over the business and has established headquarters at 94 Golden Gate Avenue.

Allen-Pursel Electric Company, a recently opened electrical store at 1225 North Vine Street, Hollywood, Calif., will specialize in merchandising electrical appliances and equipment, with a separate radio department. E. L. Allen and H. W. Pursel, the owners, were formerly with the sales department of the Hollywood Electric Company.

Circle F Manufacturing Company, Trenton, N. J., has issued a circular descriptive of its security lock-type electrolier socket for fixture and lamp use that has been added to its stock of brass shell sockets. The company also has placed on the market a ceiling light receptacle of new design that is to take the place of Nos. 218, 218-S and 219-S. A new rigid bracket socket, known as No. 1218, also has been added to the line.

Maydwell & Hartzell, San Francisco, have been appointed factory distributors for Smith & Hemenway Company, Inc., Irvington, N. J., manufacturers of "Red Devil" tools, a complete line for the electrical, automotive, hardware and radio trade.

The Charles A. Etam Company, formerly located at 3804 Third Avenue, has moved into its new store at 3733 S. Western Avenue, Los Angeles. The firm is operating as manufacturers' representatives and distributors of several Eastern manufacturers of radio and electrical equipment.

Hynes & Cox Electric Corporation, Albany, N. Y., has issued a new circular describing and illustrating its electric glue pot.